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Protein Requirements in Tuberculosis.—In 9 of 10 tuberculous patients the minimal urinary nitrogen excretion was between 2.5 and 4.5 gm. per diem and between 0.041 and 0.093 gm. per kgm. per diem. In one case the lowest excretion of urinary nitrogen was 9.4 gm., or 0.267 gm. per kgm. In the 9 cases with a minimal nitrogen excretion the diet had an energy value from 1.1 to 2.4 times the basal energy requirements of the subjects, and furnished 39 to 70 per cent of the calories in the form of carbohydrate. In some cases it is possible to maintain nitrogen balance, and even to retain nitrogen, when from 37 to 44 gm. protein are ingested, of which about one-half is from animal sources. The attainment of nitrogen equilibrium with such a small amount of protein is dependent upon the ingestion of large amounts of carbohydrate and fat, sufficient to make the total caloric value of the diet from 1.7 to 2.4 times the basal energy requirement. It is probable that the failure to establish nitrogen balance on such low protein diets is due to failure or inability of the subject to ingest sufficiently large quantities of carbohydrate and fat, rather than that it is due to an inherently large wear and tear quota in tuberculosis. Positive nitrogen balance in bed patients may be attained by the ingestion of from 60 to 90 gm. protein when the diet contains carbohydrate and fat with a total caloric value of less than 1.7 times the basal requirement. The evidence indicates that the optimal quantity of protein for patients who are confined to bed with pulmonary tuberculosis lies between the limits of 60 to 90 gm. per diem, when the caloric value of the diet is about 2500 calories. Additional carbohydrate and fat colories must be furnished when patients are allowed to exercise.—*The Protein Requirement in Tuberculosis, W. S. McCann, Arch. Int. Med., January, 1922, xxix, 33.*

Tuberculin Therapy.—Intracutaneous injections of tuberculous men with substances obtained from tuberculous and healthy guinea pigs following tuberculin injection demonstrated the absence of antibodies in an organism infected with tubercle bacilli. The tuberculin reaction, therefore, is no antibody reaction, and tuberculin acts only as an irritant. An inflammation of the tuberculin sensitive tissues may also be induced by proteins, such as bacterial toxins, provided they are administered in considerably larger quantities. Peptone and dysentery toxin gave reactions in doses of 1 mgm. The protein reactions are unspecific and do not flare up following a second tuberculin injection, as the tuberculin reaction does. Tuberculin sensitiveness enables the body to protect itself against additional invasion of tubercle bacilli or substances derived from the latter. The therapeutic procedure of the allergists, therefore, is to be preferred to that of the anergists which gives rise to overstrain of the defense mechanism by saturation with tuberculin. The administration of tuberculin for therapeutic purposes is recommended at intervals of 8 to 14 days. The author succeeded in demonstrating definite symptoms of immunity in 2000 guinea pigs given a preliminary treatment with slightly virulent bacilli. A complete immunity, however, does not seem to exist in tuberculosis. Preliminary treatment of cattle with dead bacilli or Much's *M TbR* was not followed by any immunizing effect. Living human tubercle bacilli are apparently only capable of strengthening the existing immunity of tuberculous patients. The action of bacilli of diminished virulence was studied on 34 tuberculous patients, observed for several months. The author himself reacted to the subcutaneous injection of 2 mgm. with fever of 39.5°C., persisting for three days, and he developed

a small abscess two weeks later which did not show tubercle bacilli in the pus. Doses below 0.1 mgm. were not followed by marked local or general reactions. In doses ranging between 0.1 and 1 mgm. purulent infiltrations were often seen. Four lupus cases developed lupus-like nodules following the injection of 1.5 mgm. In spite of grinding in the agate mortar to almost complete destruction, the slightly virulent bacilli could be preserved in living moist form. This preparation, containing all the substances of the bacilli in vital form, was termed *vital tuberculin* and was administered to patients in doses of 2.5 mgm. Equivalent doses of this preparation were borne much better than were living bacilli. Living bacilli in the infected organism do not multiply and soon loose their vitality; the vital tuberculin, however, is to be preferred on account of its rapid absorption by the organism. It is very important not to expose the bacterial protoplasm to heat, acid or other destructive substances. After doses less than 0.1 mgm. of the vital tuberculin, only local symptoms at the site of injection, but no general reactions were noted; injections of 1 mgm. and more were followed by definite focal reactions with fever but no suppuration. It is, therefore, advisable to begin with 0.001 mgm. and not to exceed 1 mgm. The small material studied does no permit passing definite judgment about this new preparation, although the results seemed to be better than those obtained with other tuberculins. Its administration for prophylactic purposes in noninfected children is not recommended as long as experimental study does not prove the utility of this procedure.—*Die erreichbaren Ziele der specifischen Tuberkulose-Therapie. H. Selter, Deutsch. med. Wchnschr., May 12, 1921, xlvii, 525.*

Specific Tuberculosis Therapy and Immunity.—The production of agglutinins to tubercle bacilli by preliminary treatment with an emulsion of bacilli is not associated with immunity to tuberculosis, since high agglutinin figures are not accompanied by clinical cure or improvement. The tuberculin only acts as an irritating agent and the tuberculin reaction is not an antibody reaction. It does not unite with the tissue, and is split up and eliminated from the body. The tuberculin apparently only acts in an unchanged condition. Treatment of tuberculin with pepsin diminishes, that with trypsin prevents a reaction. The effect of tuberculin is not influenced by heating to 150°C.; heating to 186° did not completely abolish its effect; and it was not destroyed until the point of combustion was reached. Tuberculin is a specific irritating agent, while the proteins act in an unspecific manner and in larger quantities. Tuberculins are made up of dead bacilli, or represent substances arising from the latter. The antigenic nature of the tubercle bacillus fat is not proved. A clinical improvement is accompanied by a decrease in the allergy, but the production of a complete anergy is impossible as long as there are living virulent tubercle bacilli in the body whose complete disappearance has never been observed to date. Sensitiveness to tuberculin in allergic tissues may be diminished by too frequent and too intense stimuli. The cause of allergy, which occurs as a result of changes in the cellular tissue after infection with tubercle bacilli and which bears no relation to anaphylaxis, remains to be discovered. In the same way the difference between the local inflammatory changes set up by proteins and tuberculins must be determined. A pure, uniformly acting tuberculin must be made by removing all irritating substances. This tuberculin must be tested on infected men, since tuberculous guinea pigs give an inconstant reaction in spite of intravenous administration. By the elimination of the quantitative differences between the tuberculins, prognostic conclusions from the local reactions might be more easily drawn. A relative immunity to tuberculosis may be obtained by infection which produces changes in the tissues and persists only as long as there are living tubercle bacilli in the body. Immunity to tuberculosis varies quantitatively. Three degrees of immunity are noted in guinea pigs following reinfections: 1. An abscess is formed, persistng to death, without or with slight involvement of the regional lymph nodes. 2. An abscess is formed, breaks through, and heals without involvement of the nodes. 3. No local reactions occurs. Or the abscess at the site of reinfection may take the same course as in the control animals, while the symptoms are more intense. In the first and second degree of immunity the abscess pus did not show tubercle bacilli. These results have been obtained by experiments on a large number of animals. There is an intimate relation between immunity and sensitiveness to tuberculin, the latter being the measure of immunity. Immunity is due to substances given off by the cells which destroy the tubercle bacilli. But these substances are not bacteriolysins. It may be that the immunity is due to ferment-like substances formed or occasioned by infection, since the action of the bacilli may be prevented by digestion with pepsin or trypsin. The

defense substances can not be transmitted by the serum. There is no immunity without sensitiveness to tuberculin, but the definite relation between these two factors is not known.—*Die Grundlagen der spezifischen Tuberkulosetherapie und der heutige Stand der Tuberkulose—Immunitätsforschung, H. Selter, Deutsch. med. Wchnschr., June, 23, 1921, xlvii, 701.*

Specific Treatment and Complete Absence of Immune Bodies.—In the entire absence of immune bodies it is necessary to determine whether there is a lasting exhaustion, that is, whether the inactive immunity is exhausted or whether this is only temporarily lost. The inactive immunity cannot be measured. Attempts to raise it by improved general living conditions, massage, rest, salt baths, roentgen ray, etc., should be tried. If, then, one of the partial antibodies is formed specific treatment can be begun, and then attempts to stimulate active immunity may be cautiously initiated. An objection is raised to Klemperer's statement that *R* is no better than tuberculin.—*Spezifische Kur und völliger Immunkörpermangel, H. Much, Beitr. z. Klin. d. Tuberk., February 10, 1921, xlvi, 414.*

Specific Therapy and Prophylaxis of Tuberculosis.—The therapeutic results obtained with specific treatment in 1919 in patients of the various stages of tuberculosis are reported. The results were good, being better the earlier (according to stage of disease) the specific therapy was instituted. The best results were attained in children with bronchial lymph node tuberculosis.—*Beitrag zur Therapie und Prophylaxe der Tuberkulose, Sons, Beitr. z. Klin. d. Tuberk., January 10, 1921, xlvi, 292.*

Old Tuberculin in Epilepsy.—In the study of the relations between tuberculosis and psychoses, 30 epileptic patients who reacted positively to O. T. were treated with increasing doses. A few cases were immunized up to 500, 800, 100, 200 mgm. An increase in the number of seizures was only seen following improper dosage; otherwise, they either disappeared or remained stationary. No deterioration or improvement of the mental condition was noted, while a marked gain in weight was attained. Epilepsy, therefore, is no contraindication to O. T. treatment, provided the initial dose is small (0.0001 mgm.) and cautiously increased by 0.0001 mgm. The general administration of O. T. to the insane is recommended as a means of reducing the mortality in the institutions for mental diseases.—*Alttuberkulin bei Epilepsie, F. Koester, Deutsch. med. Wchnschr., August 18, 1921, xlvii, 956.*

Treatment of Pulmonary Tuberculosis with Partial Antigens.—Partial antigens are useful in the cirrhotic and nodular proliferative types of tuberculosis. The diagnostic and prognostic value of the intracutaneous reaction with the antigens are, however, limited, the clinical course and titre very often having no relation to each other. One hundred and twenty-six cases were treated, 4 of which had surgical tuberculosis. Of the remaining 122 cases, 17 were in the first stage (Turban-Gerhardt), 36 in the second and 64 in the third; 95 had bacilli at the beginning of treatment and 32.6 per cent lost their bacilli. Miliary and pneumonic cases were not treated. Thirty-two cases were markedly improved; 46 improved; 37 remained uninfluenced; 2 showed aggravation; 2 cases with pronounced lymphatic tuberculosis did not improve; treatment was interrupted in 2 for non-medical reasons; and marked diminution in the number of bacilli was noted in a case treated by thoracoplasty. One case which was expected to die at admission, gained 40 pounds after two *M Tb R* courses. Daily injections were given. Injections with *M Tb R* were started with dilutions of 1: 100,000 millions and never exceeded 1: 10 millions. Slowly rising temperature, pain in the muscles, and red patches on the skin indicate cessation of injections. A definite focal reaction was seen 12 times, mostly transitory, but in some cases persisting for a long time. No hemoptysis was noted. The temperature subsided in two cases, while subfebrile and labile temperatures became normal in most cases. The author gives a detailed report of his own case. Following grippe he was taken acutely ill with open tuberculosis of the right upper lobe. Following an $A+F+N$ course a year later, increase of expectoration and bacilli with increased temperature and intense infiltration at the site of injection occurred. After the disappearance of the reaction the sputum markedly decreased and was negative for bacilli.—*Zur Behandlung der Lungentuberkulose mit den Partialantigenen nach Deycke-Much, W. Düll, Deutsch. med. Wchnschr., August 11, 1921, xlvii, 921.*

Treatment of Pulmonary Tuberculosis with Partial Antigens.—The treatment of pulmonary tuberculosis with partial antigens accomplished what its discoverers promised in the way of clinical improvement, by removing fever and causing bacilli

to disappear from the sputum. To obtain results, it is necessary that temperature irregularities, especially during the early periods of treatment, do not influence one and prevent further injections. Observations on the immunity analysis and the clinical picture revealed that immunization with *M Tb R* or *A + F + N* not only had a bacteriolytic action, but, in an indirect manner, by liberating endotoxins, an antitoxic action as well, so that antitoxic treatment with O. T. or *M Tb L* can be omitted. Of 100 treated pulmonary cases, 100 per cent of 15 stage II cases and 84 per cent of stage III cases were benefited (no stage I cases were treated). These cases also showed greater freedom from bacilli in the sputum after treatment (19 per cent negative before and 23.4 per cent negative after treatment). The following conclusions are drawn: An active immunization against tuberculosis is possible by using partial antigens; more important than the humoral immunity is the cellular immunity which is expressed by the skin reactivity and can be measured by the graduated intracutaneous reaction; for diagnosis the intracutaneous reaction has the same value as the Pirquet; prognostically the intracutaneous reaction can be used only with the aid of the clinical findings and general condition; cautious and carefully gauged partigen therapy can also be used in severe tuberculosis in which tuberculin is contraindicated.—*Die Behandlung der Lungentuberkulose mit den Partialantigenen nach Deycke-Much, Gloger, Beitr. z. Klin. d. Tuberk., January, 10, 1921, xlvi, 374.*

Tuberculin Treatment by Nasal Insufflation.—Tuberculin, if properly administered, will do fifty per cent more good than any other known substance in the treatment of tuberculosis. Paget believes that certain parts of the nasal epithelium can disintegrate tubercle bacilli and elaborate specific antibodies. The insufflation method consists in blowing 0.0001 mgm. powdered B. E. through a glass tube into the nose toward the superior turbinate bone and the ethmoid. Previous correction of nasal deformities is advised. The treatment is given every other day, increasing the dose at definite intervals. Following treatment the patient may complain of a temporary frontal headache and there may be slight fever and malaise. Cough and expectoration decrease and later the appetite and weight improve. Good results are obtained in ocular tuberculosis.—*Treatment of Tuberculosis by Nasal Insufflation Method, J. P. Israel, N. York M. J., Janaury 4, 1922, cxv, 40.*

Protein Treatment by Skin Inunction.—Treatment by the percutaneous route is considered especially favorable and along these lines the results of heliotherapy are effected. Production of antibodies is supposed to be a secretory affair and this secretion can be stimulated by injunction. Witte peptone and casein in colloidal state, given in the form of a salve, can be taken up by the skin and produce a nonspecific immunity. The skin can be sensitized beforehand by measures that draw the blood there, such as by heating or the use of mustard plasters. A leucocytosis is produced in incresasing the antibodies. Diabetics who presented symptoms of intoxication were selected, six in number, as well as seven who has symptoms of insidious disease, and when treated by the inunction method with proteins their tolerance was increased two to six times for the same diet. This method of treatment is particularly suited for a disease which is passing into a chronic state, especially rheumatic conditions, gout, neuralgia, neuritis, colitis and pyelitis. There is no danger of anaphylaxis. This work of the author dates back to 1905.—*Percutanische Eiweisstherapie, C. Finck, Med. Klinik, August, 1921, xvii, 1049.*

Non-Toxic Tubercle Bacillus Vaccine.—This vaccine has been on trial for over a year. It appears to be about 200 times less toxic than ordinary tuberculin. The tubercle bacillus can be split up into the following different constituents: 1. An alkalia-soluble protein substance, probably a nucleoprotein, capable of precipitation by acid but redissolved in an excess of acid, when it may again be precipitated by common salt. 2. An acid-soluble protein substance, precipitable by alkali. 3. A water-soluble substance precipitable by half saturation with ammonium sulphate and by 70 per cent alcohol. 4. A water-soluble substance precipitable by full saturation with ammonium sulphate and by absolute alcohol. Fractions 3 and 4 correspond biochemically to primary proteose and deuteroproteose, respectively, but may be a globulin and an albumin, respectively. 5. Other water-soluble substances,—indicators and a brownish toxic substance, soluble in absolute alcohol and not precipitated by full saturation with ammonium sulphate. 6. An alcohol-soluble lipoid, fatty or waxy, substance, insoluble in water. 7. A chloroform-soluble lipoid, fatty or waxy substance, insoluble in alcohol and in water. The last is the only fraction showing an acid-fast character when stained by the Ziehl-Neelsen method. All the fractions are antigenic except the

toxic brown substance and it would seem reasonable to include in the tubercle vaccine all except this one fraction (5). The question of the toxicity of the proteoses and of the alcohol and chloroform-soluble lipoid fractions has not been definitely determined. There follows a discussion of the biochemical composition of Koch's tuberculins, Beraneck's tuberculin, von Ruck's watery extract and Dixon's tubercle bacilli extract. The bovine bacillus can also be split into fractions but it is more easily dissolved in antiformin and contains less lipoid substance and the precipitating points of the alkali soluble fractions are different in the two types. In phthisis, vaccine or tuberculin treatment should be combined with a good mixed coryza vaccine, preferably autogenous. The detoxicated mixed coryza vaccine has been employed.—*Detoxicated Tubercle Bacillus Vaccine, D. Thomson, Brit. J. Tuberc., January, 1922, xvi, 20.*

Nasal Insufflation of Tubercle Bacillus Emulsion.—The time is close at hand when pulmonary tuberculosis will be easily cured by the practitioner in a few days to six weeks. The factors that dominate the prevention and cure of the disease are the patency of the nasal passages superior to the free edge of the middle turbinated bone, the property of the epithelium of these regions to produce antibodies potent enough to prevent and destroy the growth of tubercle bacilli in other parts of the body and the recognition of the frequency of tuberculosis of the nose, tonsils, pharynx and lungs. The author says he has by means of insufflations of tubercle bacillary emulsion artifically brought about the resolution of tuberculous consolidation, both in its early stages and after secondary changes have taken place. The length of time required is roughly proportionate to the duration of the consolidation. In the early stages tuberculous consolidations can be made to resolve as speedily as is usual in pneumococcic cases; in old cases it may take months. "Is the process nervous or telepathic, psychic or humoral?"—*Resolution in Pulmonary Tuberculosis, O. Paget, Med. Rec., February 25, 1922, ci, 329.*

The Friedmann Remedy.—The Friedmann remedy is harmless in cases free from active tuberculosis and in cases clinically free from tuberculosis when administered as a prophylactic. Its value in prophylaxis can be determined only after the lapse of a decade of more. Thirty-three patients with active open pulmonary tuberculosis were selected according to Friedmann's recomendation but in none of these was the alleged value of the remedy demonstrated. In fact, in the more extensively involved cases, owing to the danger of provoking a severe focal reaction the remedy is entirely contraindicated. The remedy is not in the least specific.—*Weitere Erfahrungen mit dem Friedmannschen Tuberkulosemittel, C. Moewes, Ztschr. f. Tuberk., October, 1921, xxxv, 103.*

Friedmann's Remedy.—Neither protection nor cure resulted from the subcutaneous injection of Friedmann's avirulent, atoxic, living, turtle tubercle bacilli.—*Über das Friedmann'sche Tuberkulosemittel, E. Hassencamp, Centralbl. f. inn. Med., April 16, 1921, xlii, 306.*

Friedmann's Remedy.—Observations on 22 patients and 63 prophylactic vaccinations showed no results with the Friedmann remedy that might not have been attained without it.—*Kontrolluntersuchungen länger zurückliegender Friedmann-Impfungen, C. Klieneberger, Centralbl. f. inn. Med., October 1, 1921, xlii, 769.*

Injurious Effect of Friedmann's Vaccine.—Friedmann's vaccine may be injurious by its action on tuberculous foci, which are mobilized, liquefied and cast off, thus giving rise to caseous pneumonia, tuberculous meningitis and peritonitis. The injuries are the greater the larger the doses and the more severe the cases: they sometimes result in death. Two cases are reported in which, shortly after the injection, hectic fever developed, and death occurred two months later. In a third case a tuberculide of the hand was markedly aggravated and increased in size following Friedmann's treatment.—*Hat das Freidmann'sche Tuberkuloseheilmittel schädliche Wirkungen? H. Grass, Deutsch. med. Wchnschr., March 3, 1921, xlvii. 243.*

Infiltration at Site of Inoculation Following Friedmann Treatment.—The curative value of Friedmann's remedy has not been proved and, therefore, aggravations following this treatment cannot be ascribed to hypersensitiveness to the turtle bacilli, as explained by Friedmann. The infiltration is looked upon rather as a local Friedmann bacillus tuberculosis with simultaneous exacerbation of the human tuberculosis following a decrease in the power of defense of the organism. The intense swelling and pain at the site of inoculation associated with aggravation, therefore, indicate activity of the tuberculous focus and diminished resistance of the body. The superficial site of the infiltration permits an early

diagnosis of this condition and immediate institution of the proper treatment.—*Das Impfinfiltrat nach Freidmann-Behandlung und seine Beziehungen zum Krankheitsbild, H. Grass, Deutsch. med. Wchnschr., March 24, 1921, xlvii, 331.*

Anatomo-Pathological Basis of Pulmonary Tuberculosis in Relation to Chemotherapy.—The literature on this subject is reviewed and discussed.—*Die Pathologisch-anatomischen Grundlagen der Lungentuberkulose in ihrer Beziehung zur Chemotherapie, A. Winkler, Ztschr. f. Tuberk., October, 1921, xxxv, 106.*

Calcium Therapy in Tuberculosis.—An inquiry, among lime and plaster of Paris manufactures in the northeastern states and Canada, brought the response that no tuberculosis was ever seen among their employees. Other observers have noted similar conditions, the phenomenon being attributed to the immunizing effect of the inhaled lime dust. This has been noted also in such localities as New Mexico, Arizona and Colorado where the arid soil contains a high percentage of calcium which the inhabitants get in dust, vegetables and fruits. Thus, in Colorado, Whitney reports that indigenous phthisis is practically unknown. In Iceland tuberculosis has shown a marked increase in recent years, but it is not agreed as to whether or not this has been due to a diet deficient in calcium. It has been shown that calcium plays an important part in the healing of tuberculous lesions, but in actual practice it has not been proved to have much curative value. This may be because the body does not retain a crystallizable substance and the calcium salts used have been of this character. In addition to fruits, vegetables, milk and eggs, patients should be given the powdered shells of fresh raw eggs, which are rich in organic calcium. A preparation of calcium, said to be in colloidal form, in combination with iron, guaiacol, sodium salicylate, mercurous iodide, iodine and sodium chloride has been used intravenously for three years. It is recommended only for incipient cases and is used in conjunction with sulphur dioxide inhalations, except in hemorrhagic cases. Six case reports are included. The value of calcium is greatest as a preventive of tuberculosis.—*The Need of Calcium Therapy in Tuberculosis, F. Tweddell, Med. Rec., January 28, 1922, ci, 141.*

Treatment of Tuberculosis with Colloidal Calcium.—Prest has used a colloidal preparation of calcium administered hypodermically in dosage of 0.5 cc. to 1 cc. in 56 patients, of whom 24 were males and 32 females. Of the 24 males, 10 had tubercle bacilli in the sputum and of these 3 lost them during treatment. Of the females, 9 showed tubercle bacilli and 2 lost them. Among the males, hemoptysis ceased in 4 cases, the temperature became normal in 1, the sputum disappeared in 2 and became much less in 4 others. Breathlessness became less marked in 1; in 2 general improvement was marked, and in the remaining 7 no change was observed. Of the females, 27 patients improved, while 5 were unchanged. Colloidal calcium seems to be beneficial in surgical tuberculosis. It stopped night sweats in a number of cases.—*The Treatment of Tuberculosis with Colloid of Calcium, E. E. Prest, Brit. M. J., January 14, 1922, no. 3185, 53.*

Inhalation of Powdered Calcium Salts in Tuberculosis.—It is known that limekiln workers do not tend to develop clinical tuberculosis; their lesions rapidly become sclerotic and healed. Coutière constructed an apparatus by means of which patients could be exposed in a dry, warm atmosphere, saturated with unslaked lime dust, powdered calcium salts and carbon dioxide. Healing was observed in 30 to 40 per cent of the cases, results being controlled by clinical, bacteriological and radioscopic observations. The effect is accomplished by an indirect calcification through the absorptive properties of the lungs, for a long time unrecognized, and by a direct calcification of the lesions. The radiograph demonstrates fixation of the lime in the tuberculous areas. The gases produce a venous stasis unfavorable for the multiplication of the bacilli. The treatment is preventive as well as curative.—*Inhalations de poudres calciques et tuberculose, Coutière, Meeting, Academie de Medecine, December 20, 1921, reported in Le Prog. Méd., December 24, 1921, no. 52, 606.*

Rôle of Silica in Healing of Tuberculosis.—Silica is found in all body tissues but is especially abundant in connective tissue. Since it has been shown that bacterial enzymes have the chemical power of reducing sodium silicate and since silica has shown beneficial results in the treatment of human and experimental animal tuberculosis, a theory is put forth to explain the sequence of events. Bacteria, gaining access to the tissues, digest the silica molecule and cause a famine of this element, allowing pyogenic organisms to gain a foothold. Fibrosis, exudation and tubercle formation are factors in subsequent healing in which silica plays an essential part. In active tuberculosis there is "silica hunger" because bacteria

deplete the systemic supply of silica. Sodium silicate, being of a colloidal nature, is suggested as a remedy.—*A Biochemical Explanation of the Silica Molecule, P. R. Vessie, Med. Rec., January 21, 1922, ci, 106.*

Chaulmoogra Oil in Treatment of Tuberculous Laryngitis.—Sixty cases treated over a period of eight months, to learn the effects on the pathological lesions of the larynx and the symptoms. In cases with dysphagia and pain in the throat, other oils proved simply emollient; but chaulmoogra oil, in the majority of cases, exerted an analgesic action, becoming more complete after repeated treatments. Improvement of the lesions was slower than was hoped for; but the response was as rapid as it is to any other drug used and the treatment was more easily borne. Preliminary cocainization was unnecessary and there was no discomfort afterward, but rather a pleasing sensation of warmth in the throat and chest. When intratracheal injections were made, sputum was rendered more fluid and was expelled with greater ease. Dryness of the throat, frequently present, was improved but slightly in the majority of cases. At first the oil was applied by means of a cotton-tipped applicator, saturated with a 10 per cent solution in liquid petrolatum, directly to the laryngeal surface. Following this, there was no pain or discomfort except for a slight momentary cough. Later the strength was increased rapidly up to the pure drug. The oil works best by intratracheal and intralaryngeal injection. One cc. of oil of the desired strength, usually 10 or 20 per cent in liquid petrolatum or olive oil, is drawn up in a Luer syringe, armed with a metal Eustachian tube catheter. While the patient holds the tip of the tongue, wrapped in a paper napkin, between the index finger and the thumb of the right hand, the syringe tip is introduced, guided by the throat mirror, into the pharynx (not the larynx) above and behind the epiglottis, care being taken not to touch any portion of the mouth or throat. Two-thirds of the contents of the syringe is discharged, drop by drop, into the trachea while the patient breathes quietly. The remainder is then dropped on the cords, while the patient phonates. In this way, cough following injection is very slight and often absent. When present, it occurs within five minutes after the injection and lasts for a minute or two. Two detailed case reports are included. It is specified that the oil was used two or three times a week. *Conclusions:* 1. The chief value of chaulmoogra oil is in the relief of pain and dysphagia. 2. The relief is continuous, in contradistinction to that produced by cocaine. 3. The treatment is not unpleasant or distressing, is without untoward reactions on the larynx and can be used without previous cocainization. 4. Improvement, while not all that could be desired, seems better than that obtained with other drugs.—*Chaulmoogra Oil in the Treatment of Tuberculous Laryngitis, R. M. Lukens, J. Am. M. Ass., January 28, 1922, lxxviii, 274.*

Fatty Acids of Chaulmoogra Oil in Tuberculosis.—The fatty acids of chaulmoogra oil, either in the form of the sodium salt or in the ethyl esters, are remedial agents that will cause a disappearance of the disease if administered over a sufficiently long period. In an advanced case of pulmonary and intestinal tuberculosis, the patient received 10 weekly injections of 2 cc. each without improvement. In a case of incipient tuberculosis, with bacilli in the sputum, the roentgen ray showing involvement of the apex, the patient so far has received 12 injections of the ethyl ester. There has been a cessation of all cough and an increase of 15 pounds in weight and disappearance of night sweats. Two patients with lupus vulgaris of the face were treated with small doses of the ethyl esters injected directly into the lesions, with complete disappearance of the lesions in one case, and great improvement in the other. The injection was repeated as soon as the reaction had passed. From these results it is concluded that the ethyl esters of chaulmoogra oil fatty acids should be given a trial in cases of this disease, as well as in other forms of tuberculosis.—*The Fatty Acids of Chaulmoogra Oil in the Treatment of Leprosy and Other Diseases, H. T. Hollmann, Archiv. Dermatol. & Syphilol., January, 1922, v. 94.*

Large Doses of Arsenic in Tuberculosis.—Since the power of organic arsenic over an entire series of infectious diseases, chiefly of protozoan origin, has been shown, along with similar powers on the part of antimonials, attempts have been made to test these doses in various affections in which there is no actual indication. Sodium cacodylate in high dosage has been used in posthemiplegic lesions, Parkinson's disease, and other chronic nervous affections. The use of the same salt in chronic pulmonary affections in reality antedates that of salvarsan in syphilis, for Levrat in 1903 and Patry in 1912 essayed its use in tuberculosis, although in relatively small doses. Therasse in 1919 and Clouet in 1921 also reported on this subject. Further, in the last mentioned year Nidergang used this salt in colossal doses in the hope of influencing the bacillus favor-

ably for the host. The drug was given by the intravenous route twice weekly—as much at a dose as 6 cc. of a 50 per cent solution without the least action on the microörganism, and consequently Nidergang condemned the idea. Clouet, writing in the *Gazette des Hôpitaux* for December 6–8, 1921, xciv, 96, does not agree with this condemnation. Irrespective of any action on the bacillus and without the necessity for such large doses, he claims good general reaction and gain in weight and strength. In other words, the drug acts by stimulating nutrition. The dose can be increased until the patient is taking one cubic centimetre of the solution daily, but the average dose over a long period is half the quantity. This is large by the book but not in comparison with the dosage of some authors. The remarkable roborant effect of large doses of strychnine in tuberculosis suggests that a combination of the two drugs in gradually increased doses should be even better than either alone.—*Editorial Note, Med. Rec., February 11, 1922, ci, 245.*

Treatment of Surgical Tuberculosis.—The operative treatment of local tuberculosis must always be radical. In synovial tuberculosis operation is indicated when the granulations undergo purulent liquefaction, when the destruction of the cartilage and capsule results in pathological position of the joint or when fistulae become portals of entry for secondary infection. Early removal of foci in the epiphysis or diaphysis will prevent infection of the joint. Artificial arthrodesis in spondylitis by grafting is not recommended. Artificial and natural heliotherapy, as well as X-rays, represent the conservative treatment of surgical tuberculosis. In favorable cases an improvement is seen in the first weeks of sun treatment; if no improvement occurs during this time results can hardly be expected. X-ray treatment, when properly administered, produces shrinkage of the granulations and stimulates periosteal bone formation, which results in solid ossification in spondylitis in a few months. The rapid disappearance of pain is remarkable. Splendid results are obtained in phalangeal tuberculosis of children. Overdosage results in liquefaction of the granulations and, therefore, in aggravation. In lymph node tuberculosis shrinkage should be produced by reaction-producing doses. Periadenitis, with encapsulated large caseous masses, calls for large doses which can produce rapid abscess formation. The pus is then removed by puncture before every treatment. The injection of iodoform-glycerin should be avoided, since the iodoform crystals prevent exact dosage as a result of secondary radiation. In the granulating variety, as well as in tuberculous hydrops, extension and regard for proper position of the joint are indicated, while liquefaction of the granulations calls for immobilization by splints and plaster of Paris bandages. Improvement but no cure has been noted after the internal administration of sodium iodide, in combination with the daily application of Bier's hyperemia for an hour. Permanent hyperemia is warned against since it gives rise to rapid liquefaction.—*Die Behandlung der chirurgischen Tuberkulose, E. Lexer, Deutsch. med. Wchnschr., July, 21, 1921, xlvii, 821.*

Treatment of Tuberculous Empyema.—Empyema may be purely tuberculous and is always secondary to an underlying tuberculosis. Its treatment by rib resection was brought into general use by König in 1892. Unfavorable sequellae, such as chronic suppurative sinuses and persisting chronic infections of the pleural cavity, have since markedly restricted the indications for the operation. In the pus from these cases tubercle bacilli can usually be discovered, if repeated searches are made. The determining factor in producing a purulent, rather than a serous exudate, containing only tubercle bacilli, is probably to be found in the amount of infectious material suddenly poured into the pleura, as would occur with the rupture of a caseous focus. With purulent effusions, not definitely metapneumonic or postinfluenzal, care should be taken to exclude tuberculosis. So called sterile pus is usually tuberculous; in other cases, secondary bacteria may be present with the tubercle bacillus. The development of the empyema may be insidious and an initial serous effusion may later become purulent. In 5 per cent of the effusions accompanying artificial pneumothorax empyema develops; many of these are the direct result of lung rupture. Whatever the mode of development or course of infection, provided the purulent effusion remains purely tuberculous, there are no indications for open drainage. These cases should be treated by aspiration, to be repeated as frequently as necessary, with simultaneous replacement of air to protect the underlying lung. In pyopneumothorax with open bronchial fistula the same method should be used, preserving a neutral intrapleural pressure to give the bronchial opening an opportunity to close. In secondary infections a similar procedure will often control the condition; it should always be tried if the patient's condition permits. If a bronchial fistula does not close, the patient dies in a short time, unless drainage is instituted. In aspirating the pus and replacing

with air, a pneumothorax outfit is used; the needle should be small to minimize the danger of a needle track infection. The manometric readings will determine whether a bronchial fistula exists. If all the pus is aspirated the introduction of 50 to 95 per cent alcohol or 2 per cent formaldehyde in glycerine sometimes seems to relieve sepsis. Gentian violet has not proved successful and Dakin's solution is contraindicated. The prognosis is often grave. Twenty-eight cases of tuberculous empyema with mixed infection have been observed in the last few years. Twenty of these had persistent bronchial fistula and were treated by open drainage; 1 is well, 10 are chronic invalids and 9 are dead. Of the 8 patients treated by aspiration, 1 is dead and the others are working and in good health. Seven case reports are appended.—*Tuberculous Empyema, L. H. McKinnie, J. Am. M. Ass., February 11, 1922, lxxviii, 400.*

Decortication of Lung for Empyema.—Roux-Berger cited a case of a woman, aged 32, who was operated on for acute empyema by Taillefer in 1910. The process became chronic despite rib resection and, one year later, seven ribs were removed and decortication of the lung was performed after resecting the parietal pleura. Two years were required for complete healing, but the patient died from tuberculosis in 1916. At autopsy the tuberculosis was found confined to the lung not operated on while the opposite lung was almost normal, so far as weight and patency of bronchi were concerned. The case seems to show that decortication of the lung is no more difficult in medical empyema than it is in the posttraumatic type. Operative difficulty may be avoided by progressive hemostasis of tissue fragments which in this case were the sources of profuse hemorrhage. Mathieu considered decortication much more difficult in so called medical pleurisies. The plane of cleavage is not clearly defined and the lung can be distinguished from the thickened pleura only by a slight difference in color.—*Résultats éloignés de la décortication pulmonaire pour empyème, Meeting, Société de Chirurgie, October 19, 1921, reported in Le Prog. Méd., November 19 1921, no. 47. 551.*

Suppuration of Nasal Cavities and Disease of Lower Respiratory Tract.—In a great many cases treated for several years for tuberculosis, suppuration of the antrum of Highmore was found to be the cause of the persistent cough which disappeared immediately after the institution of appropriate local treatment. Pus running down along the posterior pharyngeal wall often entered the larynx and gave rise to pharyngitis, laryngitis and bronchitis, with cough as a leading symptom. Laryngoscopic examination often revealed a band of pus between the arytenoid cartilages. A physician with tuberculosis of the right upper lobe improved roentgenologically and physically quite unexpectedly within a a few months after the removal of a nasal focus of suppuration.—*Über die Bedeutung von Eiterungen der Nebenhöhlen der Nase als Ursache von Erkrankungen der tieferen Luftwege, W. Stepp, Deutsch. med. Wchnschr., November 3, 1921, xlvii, 1328.*

Nontuberculous Apical Catarrh.—Cases are reported in which the diagnosis of apical tuberculosis was disproved by postmortem findings. In a case of hemoptysis with dulness and râles, the perforation of an aortic aneurysm, the size of a walnut, into the right upper bronchus simulated an apical tuberculosis. In another case, with all the symptoms pointing to tuberculosis, except absence of tubercle bacilli on repeated examinations, autopsy revealed pulmonary syphilis. In some of the cases seen by the author an open tuberculosis was disclosed in spite of absence of physical signs and a typical history. A case of hemoptysis in paratyphoid fever turned out to be due to apical bronchopneumonia. In 14 well-observed cases the physical signs were very suspicious of tuberculosis, but neither the Pirquet test nor the repeated injection of old tuberculin in increasing doses up to 200 mgm. were followed by any reaction. In the latter cases apical bronchitis and bronchopneumonia was being dealt with.—*Über Nichttuberkulöse Lungenspitzenkatarrhe, G. Liebermeister, Deutsch. med. Wchnschr., March 10, 1921, xlvii, 267.*

Foreign Body in Lung for Forty Years.—A female aged fifty-one had been well until she developed a cough and later mucoid expectoration, considered at first as symptoms of simple bronchitis. The sputum became profuse and fetid, and a diagnosis of lung abscess and a possible foreign body was made after physical and X-ray examination. The latter showed a dense vertical shadow about three inches long and a quarter of an inch wide at a distance of an inch to the right of the bodies of the vertebrae, extending upward from the diaphragm. The body could not be seen by bronchoscopy. Operation was postponed because the general condition was not good and there were persistent fever and tachycardia and increasing dyspnea and cyanosis. Before death the sputum de-

creased to almost nothing. At autopsy, in addition to an empyema on the right side and a gangrene of the right lower lobe, a slate pencil was founded encysted in a longitudinal cavity with thick connective tissue walls in the right lower lobe, about half an inch from the spinal column and immediately beneath the pleura. None of the bronchi communicated with the pencil cavity and there was no communication between it and the abscess cavity. It is likely that the pencil was inhaled and from the history it appears that it lay in the lung for forty years. The pencil had no apparent etiological bearing on the formation of the lung abscess.—*A Foreign Body in the Lung Innocuous for Forty Years, L. G. Kaempfer, Am. J. Surg., January, 1922 xxxvi, 8.*

Spirochetal Pulmonary Gangrene.—In the series of 130 necropsies at the Montefiore Hospital from May 1919, gangrenous ulceration of the bronchial branches and the lung were noted in three. A description of the pathological findings is presented and the following conclusions are drawn: 1. In three cases, the presence in large numbers of fusiform bacilli and spirochetes in early gangrenous ulceration of the lung suggests their etiological relationship thereto. These spirochetes morphologically resemble *Spirochoeta* (or *Treponema*) *buccalis, vincenti, microdentium, mucosum* and *macrodentium.* 2. In all three cases, marked dental caries and pyorrhea alveolaris were present. Smears from these lesions showed organisms morphologically indistinguishable from those mentioned above. 3. These organisms, which are poorly colored by the usual laboratory stains, are readily demonstrated by the Fontana method in smears and by the Levaditi method in tissues. 4. From a study of the pulmonary lesions in these three cases the impression is gained that they are extensive pneumonias caused by organisms from the unclean mouth, in which gangrenous ulceration occurs because of activity of the aspirated fusiform bacilli and spirochetes. 5. If the foregoing explanation is correct, this type of spirochetal pulmonary gangrene may be prevented by proper oral hygienic measures.—*Spirochetal Pulmonary Gangrene, B. S. Kline, J. Am. M. Ass., December 10, 1921, lxxvii, 1874.*

Artificial Pneumothorax and Serotherapy in Pulmonary Gangrene.—Pneumothorax treatment and the administration of antigangrene serum had a genuine effect in two cases of pulmonary gangrene, one of recent origin and the other of seven months duration. In the first case there was also a noticeable effect of the treatment on intercurrent trophic disturbances and rheumatic lesions.—*Deux cas de gangrène pulmonaire traités par le pneumothorax et le sérum antigangréneux associés, l'un après plus de 7 mois d'évolution; l'autre au 14 jour de la maladie. Guérison., Denéchau, Esteve and Quartier, Meeting, Société Médicale des Hopitaux, November 18, 1921, reported in Le Prog. Méd., November 26, 1921, no. 48, 560.*

Actinomycosis of Urinary Organs.—In the literature there are only 10 cases similar to the one reported here. Actinomycosis should be considered in cases of suspected tuberculosis in which tubercle bacilli cannot be found; heretofore the diagnosis has usually been made only at autopsy. This patient had recurring attacks of pain, usually on the right side but sometimes on the left, radiating to the bladder and accompanied by chills, fever, nausea and vomiting. Cystoscopic examination showed a diffusely reddened bladder characteristic of cystitis. The trigone was markedly inflamed, especially about the ureteral orifices. Ureteral catheterization recovered from both sides a large quantity of pus, devoid of pyogenic or acid-fast bacteria. The phenolsulphonephthalein test showed an output of 15 per cent on the right and 30 per cent on the left in thirty minutes. X-ray showed a pyelitis on the left; there was no destruction of tissue as seen in tuberculosis. The urine contained a trace of albumin and considerable pus. Microscopic and cultural studies revealed an infection of both kidneys with an organism rarely found, *Pseudomonas pyocyanea*, complicated with the presence of *Actinomycosis bovis* in the right kidney. Treatment with a variety of drugs was without effect. References to the literature are cited.—*Actinomycosis of the Urinary Organs, H. L. Cecil and J. H. Hill, J. Am. M. Ass., February 25, 1922, lxxviii, 575.*

Trichomonas in Pulmonary Gangrene.—A patient had symptoms of chronic bronchitis and emphysema for three years, followed by a period during which repeated hemoptysis occurred. Tubercle bacilli could not be found. During a sudden, sharp attack with fever the patient expectorated four litres of blood-tinged pus in three days. Simultaneously, the physical signs of cavitation developed. A flagellate, identified as *Tricomonas intestinalis*, was constantly present in the sputum. At autopsy no trace of tuberculosis was found. A gangrenous abscess involved most of the lower left lobe. *T. intestinalis* was found, not only in the pus, but also in the adjacent paren-

chyma.—*Gangrène pulmonaire et Trichomonas, J. Parisot and P Simonin, Compt. Rend. d. Soc. Biol., December 10, 1921, lxxxv, 1077.*

Pulmonary Sporothricosis as Cause of Bronchial Asthma.—The patient, a female, 18 years old, gave a history of having had since infancy sudden attacks of shortness of breath and wheezing, lasting from one to four days. The only noteworthy physical sign was asthmatic breathing. The X-ray showed thickening of the pulmonary hila and larger bronchi. The sputum was water thin and colorless, with many white or pale yellow pinhead-sized flakes in it. Microscopically, the flakes consisted of mycelia and yeast-like cells. The culture showed a growth characteristic of sporothrix. Sodium iodide was given, increasing by three grains daily, from an initial dose of forty-five grains to one of ninety grains; the latter dose was maintained for three months. The patient recovered and the yeasts disappeared from the sputum.—*A Case of Bronchial Asthma Possibly Due to a Sporthrix, O. H. Stansfield, Boston M. and S. J., December 1, 1921, clxxxv, 659.*

Artificial Pneumothorax in Diagnosis and Therapy of Echinococcus and Abscess of Lung.—The result of artificial pneumothorax in a case of pulmonary echinococcus cyst and a case of abscess of the lung is given in detail. In both cases it proved a valuable diagnostic aid. The therapeutic value in the echinococcus case was in hastening healing and preventing hemorrhage after operation for its removal, although there was danger in its institution because of possible evacuation of the contents of the cyst into the lungs. The therapeutic effect before operation was nil. In the abscess case the pneumothorax was of diagnostic value in determining the condition of the pleura, adhesions and lung sequestra demanding an operation, while therapeutically it protected the compressed lower lobes from aspiration of infectious material.—*Der künstliche Pneumothorax als diagnostisches und therapeutisches Hilfsmittel bei Echinokokkus und Abszess der Lunge, H. Stöcklin, Beitr. z. Klin. d. Tuberk., January 10, 1921, xlvi, 256.*

Pathological Anatomy of Syphilis of Lung.—The necrosis in gummata of the lung is due to the obliteration of blood vessels. Four stages are recognized histologically in the development of syphilis of the lung; (1) catarrhal, with beginning inflammatory tissue formation; (2) sclerogummatous without bronchiectasis and with exudation in the alveoli; (3) sclerogummatous with bronchiectasis and resolution in alveoli; and (4) sclerosis. In the earlier stages fibroblasts multiply and obliterate alveoli, leaving the finer divisions of the bronchioles open, and resembling tubular glands. Mononuclears, lymphocytes and plasma cells are present in large numbers. The cellular proliferation is not accompanied by a corresponding vascular organization. Later the alveoli again become patent from the periphery to the centre of the lobule, as the cell bodies of fibroblasts diminish in size and the fibrils augment. The bronchi dilate. Perivascular and peribronchial nodules increase. A desquamative alveolitis occurs. Macroscopically the following stages are distinguished: (1) catarrhal pneumonia; (2) consolidation, of rubbery consistence; (3) similar to (2) but with bronchiectasis; (4) sclerotic consolidation like dry rubber.—*Anatomie pathologique des pneumonies syphilitiques, P.-I. Elizalde, Comp. Rend. d. Soc. Biol., November 17, 1921, lxxxv, 958.*

Coexistence of Cancer and Tuberculosis in the Same Organ.—By one of those snap generalizations which are not peculiar to medical practice it was decided long ago that tuberculosis and cancer, being radically different from each other, could not possibly coexist in the same organism or at least in the same organ. It was admitted that epithelioma could and often did develop in the margin of a lupus, but this could be explained away by saying that cancer had a predilection to develop in any ulcer and that lupus was a very attenuated and slowly evolving form of tubercle. In some few cases cancer has developed in the tuberculous lung, breast, uterus, liver, etc., but this very rarity has been assumed to indicate some mystery of pathology. The grafting of a tuberculous process on cancer is even less frequent if possible and practically consists of tuberculous adenopathy regional to a primary cancer. Actual grafting of tubercle on cancer has been reported only two or three times. The great infrequency of these coincidences shows that the old generalization was not based on error of observation, but the fact remains that the two processes can coexist even in the same lesion. Duvergey and Jeanneney in the *Journal de Médecine de Bordeaux* for December 25, 1921, xcii, 19, append a bibliography of 16 recent references to the coexistence and mention two Bordeaux cases published before their own, which makes three from one locality within a short time. Villar found tuberculous axillary nodes with a cancerous breast. Dubreuilh saw epithelioma on the back of the hand with tuberculous adenopathy and now the present

authors relate the case of a superficial lesion of the scrotum, proved later to be cancerous, with a mixed cancerous and tuberculous inguinal adenopathy affecting a single lymph node. It is assumed in such a case that originally there had been a tuberculous node which was secondarily affected with metastatic cancer.—*Editorial Note, Med. Rec., February 11, 1922, ci, 245.*

Pulmonary Arteriosclerosis Secondary to Bronchopulmonary Processes.—Pulmonary arteriosclerosis secondary to certain pathological bronchopulmonary processes, such as emphysema with repeated attacks of bronchitis, presents characteristic clinical features; if the latter were recognized this serious and supposedly rare condition would be diagnosed more frequently. These features include dyspnea, not influenced by rest and developing progressively after a sufficiently long period of duration of the bronchopulmonary phenomenon, intense cyanosis with polyglobulism, dilatation of the retinal veins, deformity of the fingers, severe headache, somnolence and cardiac insufficiency uninfluenced by rest or other measures. On physical examination no murmurs are heard but there is intense accentuation of the second pulmonic sound, occasionally a gallop rhythm and rarely edema and arhythmia. The essential orthodiagraphic features are the predominating development of the right ventricle and dilatation of the pulmonary artery, extending to the hilum, and opacity of its walls. The electrocardiogram shows an electrical preponderance of the right heart and a diminution of its tonicity. In the development of this sclerosis pulmonary hypertension certainly plays a rôle, but some secondary factors evidently render the vascular walls especially vulnerable to the mechanical action of the hypertension; the nature of these factors is not entirely known. Laubry considered the radioscopic signs of prime importance and pointed out that this condition seemed to be a transition between generalized arteriosclerosis of mitral origin and the localized forms that are seen in such chronic pulmonary lesions as tuberculosis with emphysema.—*Sclérose de l'artère pulmonaires secondaire à des processus broncho-pulmonaires, P. Ribierre and R. Giroux, Meeting, Société Médicale des Hôpitaux, November 4, 1921, reported in Le Prog. Méd., November 12, 1921, no. 46, 540.*

An Unusual Pulmonary Neoplasm.—The patient, a female aged 23, had a cough, blood-streaked sputum, afternoon temperature of 100° to 101° and tachycardia for ten days. An examination made 19 months prior to these symptoms was essentially negative. At the time of the development of symptoms râles were present over the right hilum and a stereogram showed a distinct, clean cut, spheroidal shadow in the upper part of the right hilum, 3.5 cm. in width. Sputum, Wassermann test, tuberculosis complement fixation test and blood counts were negative. After a ten months' interval of freedom from symptoms, except for a slight cough, there was a recurrence and the right hilum shadow had doubled in size. After three months symptoms had again subsided but later there were two similar recurrences, one of them accompanied by hemoptysis. Sixteen months after the initial attack the shadow occupied most of the right thorax except the apex and the costophrenic angle. Operation revealed a soft tumor mass proving to be a spindle cell sarcoma. Following operation and, later, radium treatment recovery was rapid. The nature of the lesion was not determined before the operation. The recurrence of symptoms and their character were similar to those seen in many cases of pulmonary tuberculosis.—*An Unusual Case of Pulmonary Neoplasm, J. S. Pritchard, Am. J. Roentgenol., October 1921, viii (new series), 555.*

Sequellae of Influenzal Pneumonia.—In influenzal pnuemonia when *Streptococcus viridans* was present, the organism seemed to have a predilection for peribronchial tissues and nodes. Physical examination showed apparently unresolved areas posteriorly at the roots of the lungs. The voice sounds were pronounced here and out of all proportion to the general condition of the patient. This physical picture continued for weeks after the patients had recovered and seemed in usual health. They complained only of lassitude and early fatigue. In such cases, where there may be involvement of the mediastinal nodes, a diagnosis of tuberculosis should not be made unless justified by careful and sufficiently prolonged observations.—*Complications and Sequellae of Influenzal Pneumonia, O. S. Wightman, Med. Rec., February 18, 1922, ci, 274.*

Tuberculous Mediastinal Abscess Producing Pressure on Trachea.—Riedel reports a case of a tuberculous abscess of the posterior mediastinum which compressed the trachea and bronchi with resulting dyspnea, so severe that the patient's life was endangered. The abscess was drained from behind by resection of the third and fourth ribs close to the spinal column. After the operation, the patient was given a course of

tuberculin treatment and heliotherapy. Ultimate recovery occurred. A brief review of the literature is appended.—*Lebensrettender operativer Eingriff bei prävertebralem tuberkulosem Abzess im Mediastinum posticum, G. Riedel, Münch. med. Wchnschr., September 16, 1921, lxviii, 1190.*

Recurrent Contralateral Spontaneous Pneumothorax.—The patient, following a week's hard work, developed a typical, spontaneous, right pneumothorax. Recovery was uneventful until, five weeks later, a similar condition appeared on the left side. In three weeks he was well again. The patient had been apparently well previously and no constitutional symptoms accompanied the attacks. However, his improvement in strength and weight during three months' rest, a family history of tuberculosis and the roentgenographic examination led to the conclusion that there was an underlying tuberculous lesion. The case is the sixth reported in the literature of spontaneous pneumothorax recurring on opposite sides.—*A Case of Recurrent Spontaneous Pneumothorax, H. Morrison, Boston M. S. & J., December 1, 1921, clxxxv, 659.*

Double Exudate in Pneumothorax.—A detailed clinical and roentgenological description is given of a case of severe left-sided pulmonary tuberculosis, in which pneumothorax produced beneficial effects even though an exudate developed which later became purulent. The exudate occurrred in two layers. Roentgen examinations in different positions demonstrated the two layers communicating through a small opening. To explain this condition it is considered that as a result of an interlobar pleuritis an adhesion developed which, in spite of the collapse of the lung, remained intact throughout its entire extent and thus divided the pleural space into two chambers. The caudal chamber developed an exudate which in the horizontal posture passed into the lower chamber, through a lateral and upper tear in the septum, while part remained in the upper portion of the dividing membrane. The clinical and pathological aspects of interlobar tuberculous pleuritis is discussed. It is of common occurrence and is but little known, since the diagnosis of the condition *in vivo* is beset with difficulties.—*Etagenförmige Exudate bei Pneumothorax, A. Joss, Beitr. z. Klin. d. Tuberk., January 10, 1921, xlvi, 192.*

Hutinel's Disease.—In 1893 Hutinel described an affection which he termed cardiotuberculous cirrhosis of children. With the exception of Kussmaul's *mediastinopericarditic callosa*, which is probably the same affection, it does not reappear in literature for many years. Hutinel redescribed it in 1908, and since that period there has been a number of contributions to the subject. As described by the French pediatrist, the disease begins as a bronchitis or a pleurisy and then there supervenes an enlarged liver with ascites, with the added picture of asystolia, edema, and cyanosis. But there may be neither antecedent bronchitis nor pleurisy, the initial manifestation being an adhesive pericarditis. During life the cardiac lesions may give inconspicuous and diverse symptoms. Autopsy on advanced cases shows a large nutmeg liver, pericarditis, pleurisy, mediastinitis and at times tuberculous peritonitis. The entire process is regarded by Hutinel as a tuberculous perivisceritis. There has been much speculation as to the mechanism and sequence of these lesions. According to one view, adhesive pericarditis in the child is quite capable of setting in motion the entire sequence, while another view is that the involvement of the heart is entirely secondary. In the *Revue médicale de la Suisse romande* for October, 1921, xli, 10, Curchod contributes an article on the subject with several personal cases. Under the head of theories and differential diagnosis one certainly would expect some reference to the peculiar affection known as polyserositis, but there is none, and the bibliography contains no allusion to such a malady under any of its numerous synonyms. Nevertheless, some of the cases which have been described under polyserositis might well have been cases of Hutinel's disease. The latter is indeed peculiar to children while polyserositis is regarded as an affection of adults; nevertheless, the patient with Hutinel's disease may be in his twenties when he comes to consultation. Some cases of polyserositis are tuberculous and the entire syndrome has been looked upon by some internists as a paratuberculosis. In one respect there seems to be a marked difference. Polyserositis has been esentially a medical disease ending in a cachexia, while in Hutinel's disease resection of the thorax has been thought of even by the discoverer himself as a means of relieving the compression of the heart by its fibrous investment. In Curchod's three cases one was regarded as inoperable while two cases were subjected to operation, one result being "satisfactory." The patient lived two years after operative relief. The other case ended fatally despite operation. The latter is known as precardiac thoracectomy, the technique of which was originally formulated by Brauer. There was apparently

no additional attempt at cardiolysis. In his clinical and autopsy details Curchod on several occasions uses the term polyserositis, apparently as a convenient descriptive term, but there is no point of contact with the polyserositis of internists, which has an extensive literature and which was independently isolated as an autonomous disease by a number of clinicians, as Bamberger, Pick, Curschmann, and others. Originally the clinical pictures differed among themselves, but eventually were brought under a single fundamental disease. One cannot escape the conviction that the latter broad conception can readily be made to include Hutinel's disease.—*Hutinel's Disease, Editorial, Med. Rec., December 31, 1921. c, 1160.*

Leukemia and Tuberculosis.—The possible etiological rôle of tuberculosis in leukemia is considered. A case of leukemia of five month's duration in a twenty-six year old man is described. Apparently of the myeloid type at the start, it was characterized by a high proportion of lymphocytes in the terminal stages, with a white cell count of 90,000. At necropsy an extensive tuberculous peritonitis was found, with massive caseation of the mesenteric lymph nodes, nodules in the omentum, intestines, liver and spleen, and serofibrinous ascites. The histological characteristics of leukemia were not to be seen in the lymphoid structures of this region. Many acid-fast bacilli were found in stained specimens. Results of other investigators, which are reviewed in this article, suggest that some leukemias have a tuberculous etiology. It is desirable that in the investigation of leukemia search be made routinely for tuberculous lesions, and that the nature of such be verified by animal inoculation.—*Leucémie et tuberculose, P. Émile-Weil and Coste, Presse Méd., November 23, 1921, No. 94, 929.*

Prognosis of Pulmonary Tuberculosis.—The following factors should be considered in making a prognosis: activity of the process revealed by the constitutional symptoms and physical findings; form of the disease; extent of the lesions in the lungs; and presence of complications. In cases with sudden onset the prognosis is worse than in those in which the disease came on insidiously. The most unfavorable cases are those showing marked constitutional symptoms which are out of proportion to the findings on physical examination. The higher the morning temperature, and the nearer it approaches the evening temperature, the worse the prognosis. Persistent high temperature that does not yield to treatment is an element of fatal prognosis. Tachycardia is an indication of the acuteness of the process, low resistance or both. Those with hypertension have a better outlook for recovery than those with hypotention. Persistent anorexia and gastrointestinal disturbances and a progressive diminution of weight are of grave prognostic significance. Regarding complications, laryngeal involvement may become chronic, or arrested, or the patient may die in from six to eight months. In the majority of cases hemoptysis has no influence on the course and prognosis of the disease. Intestinal tuberculosis aggravates the prognosis. Empyema is a bad complication. Spontaneous pneumothorax is fatal in 95 per cent of cases within one month of its occurrence. Tuberculosis of the kidney is of unfavorable import. The dangers of tuberculous cavities vary inversely with the time it takes for their formation. Favorable factors influencing prognosis are a phlegmatic attitude, gentleness of disposition, alertness of intellect and strength of will. Pregnancy is a grave complication of phthisis as a rule. The very young and the old do badly. There are decidedly better results among females than males. Race has been found to exercise a considerable influence upon prognosis.—*Prognosis of Pulmonary Tuberculosis, G. H. Crofton, Milit. Surg., January, 1922, I, 32.*

Tuberculosis Mortality in New York City According to Sanitary Areas of Manhattan.—The Bureau of Records of the Department of Health has been accounting, since 1915, for the number of deaths from pulmonary tuberculosis among local residents in the entire borough of Manhattan by small districts, and the New York City 1920 Census Committee has made available the figures of local population in each district, thereby enabling a compilation of comparative death rates. The Statistical Research Service of the New York Tuberculosis Association has utilized the data to prepare a graphic map, which illustrates the distribution of mortality during the six year period of 1915–1920, inclusive. Looking over the tuberculosis map, it is first seen that some thirty sanitary districts in Manhattan—following the divisions of the 1920 census map—had death rates from pulmonary tuberculosis during the six year period ending in 1920, exceeding 400 per each 100,000 inhabitants. In other words, there are a number of sections in New York where tuberculosis claims as many victims as in Vienna, or in the war-devastated sections of Poland or Serbia.

Along all of the lower West Side and in every district south of Canal and Catherine Streets in lower Manhattan, excessive

death rates prevailed. In Harlem, north of One Hundred and Twenty-sixth Street and east of Eighth Avenue toward the Harlem River, similar areas of high mortality from tuberculosis exist. Finally, somewhat along the central East Side, concentrating between Fourteenth and Forty-fourth Street, there is also a high death rate. In the sections just mentioned reside populations which include the colored in the "San Juan Hill" district of the West Fifties, the poor and rough district of "Hell's Kitchen," the longshoremen along the lower North River, the very dense and poor districts of "Little Italy" around Mulberry Bend, "Chinatown" between the Bowery and Chatham Square, and, in lower Manhattan in the New York Dispensary district, the remnants of the poorer Irish immigration which followed the famine year of 1848.

Comparatively low death rates from tuberculosis, on the other hand, have been found in the lower East Side, east of the Bowery and below Fourteenth Street. These sanitary districts are mainly inhabited by a Jewish population, and, though it is a poor section, containing some of the most thickly populated blocks in the city, the marked resistance of this people to tuberculosis is clearly shown here, the tuberculosis death rate being below the average of the entire city. During the six year period, 1915–1920, inclusive, the pulmonary tuberculosis death rate in New York was 148 per each 100,000 population. In the lower East Side sanitary area, bounded by Avenues B and D and East Third and Ninth Streets, which is included in the section just referred to, the death rate from consumption was only 69, or less than half of that of the city at the same time, even though here the last Federal Census showed a local population of 33,773 inhabitants, or a density of 650 people per acre.

The lowest tuberculosis mortality in New York occurred in the district facing Central Park, bounded by Sixty-third and Seventieth Streets, and between Fifth and Park Avenues. Although some 4,000 people reside there, only five deaths of local residents occurred from tuberculosis, giving a mortality of 21, or seven times less than that prevailing in the entire city At the same time, in districts nos. 34 and 154, located downtown in the old sections around Mulberry Park or in the old houses still utilized below Liberty Street, tuberculosis was taking victims at a rate fifty times as great as in the Fifth Avenue district. Six persons out of every one hundred living there died from pulmonary tuberculosis between 1915 and 1920. All along Riverside Drive, north of West Seventieth Street, a low tuberculosis mortality prevailed, some districts having as low rates as 32 per 100,000, or an average of one-third the city's death rate during the period 1915 to 1920.

In general, the pulmonary tuberculosis death rate in the Borough of Manhattan of New York City, during the six-year period 1915–1920, was highest, and above the average, all along the lower West Side district, in the New York Dispensary district east of Broadway and up to Canal Street, in all of the East Side sections north of Fourteenth Street as far as the Forties, and in the Central Harlem district—the highest rate being 344 per each 100,000 population in the New York Dispensary tuberculosis clinic district, with a gradual decline to 190 in the Harlem district.

On the East Side, between Nineteenth and Forty-fourth Streets, east of Third Avenue, the old-type tenements still remaining there contain a number of rooms with windows opening only on small shafts, and a tuberculosis death rate well above twice the average for the city prevails here.

Tuberculosis death rates below the average for the entire city prevailed notably on the lower East Side and in the Mt. Sinai Hospital district around One Hundredth Street, followed by areas of very low mortality on the West Side of the city north of Eighty-sixth Street, far up into Spuyten Duyvil, where, in the upper Riverside Drive section, the lowest rate for the entire city is found, except along the few blocks on Fifth Avenue between Fifty-sixth and One Hundred and Fifth Streets.—*Tuberculosis Cornered in New York City, G. J. Drolet, Bull. New York Tuberc. Assoc., March–April, 1922, iii, no. 2, 1.*

Tuberculosis and Curvature of Van Pesch.—In 1885 the Dutch vital statistician, Van Pesch, drew attention to the peculiarity of the curve of death rates which he first noticed in the Netherlands statistics of 1870–1879 and again found in the three following decades. This peculiarlty, sometimes called the curvature of Van Pesch, consists in an inflection of the generally concave arc especially prominent in the curve of death rates of males at about the twenty-second year of life, less distinct and beginning one or two years earlier in the curve of female mortality. This inflection is not peculiar to Dutch statistics, but is present in greater or less degree in those of other nations. Eijkman has ascertained that, at least in the statistics of the Netherlands, the curvature is due to mortality from phthisis.—*Pulmonary Tuberculosis and the "Curvature of Van Pesch," C. Eijkman, Jour. Hyg., December, 1921, xx, 363.*

Increase of Tuberculosis during World War and Its Causes in Germany.—1. *The increase in tuberculosis during the war:* Accurate figures are not available because obligatory reporting of tuberculosis does not exist in Germany. Some observers hold that there was no increase during the war and that only the mortality from tuberculosis increased; this view is not concurred in. The increased mortality is an evidence of increase in the number of the rapidly progressive and acute cases. (*a*) *Tuberculosis mortality in various countries*: These figures were obtained by the writer from very reliable sources in the various countries mentioned. In order to arrive at reliable comparative statistics the absolute figures were reduced to mortality per 100,000 living inhabitants which also has disadvantages since many of the censuses were taken as far back as 1910. Statistics for over 380 German cities of 15,000 or more inhabitants show an increase from 157 per 100,000 in 1913 to 287 in 1918. The types producing death in Prussia rose from 119.2 per 100,000 due to pulmonary tuberculosis in 1913 to 204 in 1918; from 15.9 for tuberculosis of other organs in 1913 to 24.3 in 1918; and from 1.5 for acute miliary tuberculosis to 1.7 in these years. It will thus be seen that even before the war the mortality from tuberculosis in Germany was high. In Austria-Hungary reliable statistics are available for only two cities, as follows:

	1913	1914	1915	1916	1917
Vienna.....		286.6	322.3	353.1	405.2
Budapest...	334.8	340.0	366.0	413.0	470.0

In Denmark there was a mortality in 1913 from pulmonary tuberculosis of 104.4 per 100,000, 107.9 in 914, 102.9 in 1915, 122.8 in 1916, 135.7 in 1917, and 102.6 in 1918. Holland, Norway, Sweden and Switzerland had figures similar to those for Denmark for this disease, showing that even in these countries the war wrought its effect. England had in 1918 a mortality from tuberculosis of 169.4 per 100,000, the highest figure for that country since 1904. No statistics were available from France for this period, though the mortality of the French war prisoners was high. 2. *Mortality in city and country:* Ever since health statistics have been kept in Prussia (since 1876) the tuberculosis mortality has been greater in the cities than in the rural communities. During 1876 to 1886 the mortality was 288 per 100,000 in the country, and 362 in the cities, or 20.5 per cent higher in the latter. From 1887 to 1898 there occurred a steady decrease in both the city and rural districts, 260 per 100,000 dying in the cities and 238 in the country, or an excess of only 8.5 per cent in the cities. From 1899 to 1913 the differences again were greater, 201 in the cities and 155 in the country, or 22.7 per cent greater in the cities. During the war period, 1914 to 1918, the mortality per 100,000 population was 209 for the cities and 144 for the country population, an excess of 31.2 per cent in the cities. During the war the percentage increase in mortality in 38 cities and rural communities of Prussia was 72.5 in the former and 55.5 in the latter. 3. *Mortality according to sex:* For 37 years, from 1876 to 1913, the mortality form tuberculosis among males in Germany was 15.4 per cent higher than in females. During the war there was an average mortality of 178.1 for men and 172.4 for women. In fact, in the state of Prussia it was higher in 1918 for women than for men. The average mortality for the cities during the war for the two sexes was 10.2 per cent higher in men than in women; for the rural districts, however, it was 6.5 per cent higher for women than for men. During the 37 years preceding the war the average mortality in the cities was 25.3 per cent and for the country 7 per cent higher for men than for women. The mortality in the cities during the war from pulmonary tuberculosis was 11.2 per cent higher in men, and in the country 7.4 per cent higher in women. From tuberculosis of other organs, it was 5.1 per cent higher in men in the cities and 1. 2 per cent higher in men in the country; from acute miliary tuberculosis, 5.4 and 22.2 per cent higher, respectively, in men in the cities and in men in the country. 4. *Mortality according to age*: From 1887 to 1912 the mortality was highest for ages 30 to 60 and for ages over 70. During the war, however, the mortality increased for all ages. 5. *Causes for increase mortality*: (*a*) *Occupation*: The ages of greatest increased mortality during the war were from 15 to 20 years (63.5 per cent); next, from 20 to 25 years of age. Many of the latter were drafted into the army and thus were often taxed beyond their strength. Before the war the tuberculosis mortality in Prussia was greater for males than for females at almost all ages except ages 5 to 20 and 25 to 40, for which ages, however, there was only a slight excess of females. During the war, however, the female mortality exceeded the male for almost all ages, especially for ages from 10 to 25. This increase was undoubtedly due to the greater demand made during the war upon the psychic and physical resources of girls and women. In 1917 a considerable increase in the number suffering from suppression of the menses occurred among girls working in the munitions factories as well as an increase likewise in abortions.

The long waiting in line for rations also fell to the lot of women. Often these women had to wait the entire day before they were served and that in all sorts of weather. The numerous women and young boys obliged to work in munitions and other factories undoubtedly also had much to do with the above mentioned increase in tuberculosis mortality. (*b*) *Housing conditions*: According to the governmental statistics for Berlin for May 31, 1918, for every 1000 dwellings the following living arrangements prevailed:

Workroom only	0.35	17.85
Kitchen only	17.5	
1 living room, no kitchen	64.	402.7
1 living room, with kitchen	338.7	
2 living rooms, no kitchen	3.	343.9
2 living rooms, with kitchen	340.9	
3 living rooms, no kitchen	0.68	114.2
3 living rooms, with kitchen	113.5	
4 living rooms, no kitchen	0.15	60.45
4 living rooms, with kitchen	60.3	
5 living rooms, no kitchen	0.04	28.34
5 living rooms, with kitchen	28.3	
6 living rooms, with kitchen	14.2	21.4
7 living rooms, with kitchen	7.2	
8 living rooms, with kitchen	3.7	9.1
9 living rooms, with kitchen	2.0	
10 living rooms, with kitchen	1.2	
over 10 living rooms, with kitchen	2.2	

In Berlin, therefore, 40 per cent of the dwellings consisted of only living room with or without kitchen; 34 per cent of 2 living rooms with or without kitchen; 17 per cent of 3 to 4 living rooms with or without kitchen; little over 4 per cent of 5 to 7 living rooms and only 1 per cent of more than 7 living rooms. In 1905, of 522,558 dwellings in Berlin there were 1.3 with no heated rooms, 47.6 per cent with one, 34.2 per cent with two, 11.1 per cent with three, 4.3 with four, and only five or more heated rooms. Hence, in 49 per cent of all these dwellings there was a tuberculous person who had to share the only heated room with the others. During the war these conditions were aggravated (1) because of increase in city population which followed the influx necessitated by the manufacture of arms and munitions, (2) because of the decrease in the buildings of dwellings due to scarcity of building materials and of skilled workmen; and (3) because of the shortage of fuel. The decline in building projects is seen from the following Berlin statistics:

	DWELLINGS		OTHER BUILDING WITH DWELLINGS		TOTAL DWELLINGS	
1910	212		31		5930	
1911	220		31		6084	
1914	80	130	21	40	1817	2773
1915	36		12		733	
1916	12		2		203	
1917	1		3		15	
1918	1		2		5	

According to normal building activities, instead of only 2,773 dwellings being erected during the war, 30,035 should have been erected. (*c*) *Food conditions:* When after September, 1914, the battle of the Marne made it evident that the Germans had to conserve food and could not rely on importation, governmental food control was established early in 1915 with rationing of bread, and soon afterward with that of potatoes and pork. In 1916 to 1917 the scarcity of fresh meat was noticed. In 1916 milk was rationed, and had by this time already sunk below 30 per cent of the quantity required. Soon eggs, cheese, sugar, fish and finally all food were put under distribution control, because of actual scarcity. Up to the spring of 1916 the food supply was tolerable but, after the failure of the wheat and potato crops in the latter part of 1916, conditions became very serious. In 1916 the ration allowed per capita contained 1983 calories per day with 53.8 grams of protein, which was reduced to 1344 calories with 31.1 grams of protein and in June, 1917, to 1100 calories and 30.1 grams of protein. This food shortage was especially deleterious in institutions of various kinds where a form of hydremia and a great increase in tuberculosis incidence was manifest. —*Die Zunahme der Tuberkulose während des Welt-Krieges und ihre Gründe, M. Kirchner, Zeitschr. f. Tuberk., May, 1921, xxxiv, 228.*

Tuberculosis in German Army.—The incidence of tuberculosis in the German army during the years of the war was as follows: During the first year of the war, 11,809 soldiers or 2.7 per cent; during the second year, 32,333, or 4.8 per cent; during the third year, 41,460 or 5.7 per cent; during the fourth year, 39,531 or 5.6 per cent. The total was 125,133 or 4.88 per cent of the entire armed force. Of this number the following tuberculous soldiers were from the army in the field: In the first year, 7,156, or 2.8 per cent; in the second year, 6,865, or 1.7 per cent; in the third year, 5,526 of 1.1 per cent; and in the fourth year, 3,929, or 0.78 per cent. From these governmental statistics it will

be seen that the fighting contingency of the army at the front was not responsible for the increase in tuberculosis among soldiers during the war, but this was due rather to the constantly increasing need for men and the consequent selection of less fit persons from the civilian population. The incidence of early cases seems to be rather slight. Many of the incipient cases seemed to have been benefited by the army regimen, so that they left the army much sturdier than when they entered. It is generally admitted that the more advanced cases were generally harmed by military life; but it is not so generally admitted that the more acute forms of tuberculosis, such as meningitis and miliary tuberculosis, were more frequently encountered during the war than during peace. It may possibly be conceded that the more virulent and progressive course of the disease was more frequently encountered. The more frequent occurrence of hemoptysis is not generally conceded. The ability of the tuberculous to render service was sometimes amazing. Autopsies on soldiers meeting with sudden death sometimes revealed cases of far advanced active tuberculosis in those who had had strenuous service of the most taxing nature. The term "war plague," as applied to tuberculosis, is undoubtedly a misnomer. Of 125,133 soldiers diagnosed tuberculous, 19,325 or 15.4 per cent died during the four years of the war. This was 0.75 per cent of the entire enrollment of the German army. The number of soldiers dying during the first year of the war was 1574; and 4164, 5984, 7606, respectively, during the second, third and fourth years. Of the above number of tuberculous soldiers, 43.9 per cent were rendered unfit for service and 40.6 per cent fit for some form of service.—*Die Tuberkulose im deutschen Kriegsheer, Schultzen, Zeitschr. f. Tuberk., October, 1921, xxxiv, 530.*

Legal Control of Tuberculosis.—As early as the beginning of the eighteenth century various Italian states required the reporting of tuberculosis. In 1733, in Lucca, not only physicians but anyone having knowledge of patients ill or dying of tuberculosis were required under severe penalty to report this to the health bureau. Since Koch established the etiology of the disease in 1882 most of the civilized countries have required by law that tuberculosis be reported. In Germany, leprosy, cholera, yellow fever, spotted fever, plague and smallpox are all reportable diseases, but the law regarding tuberculosis is left to the individual states. Some states require that only deaths from tuberculosis be reported; others, merely severe cases; still others, only change of residence of the sick person. Some of the larger cities of the United States require that not only manifest but also suspected cases of tuberculosis be reported. This holds especially for school children. The legal fight against tuberculosis should have two aims: (1) care of the sick and (2) the protection of associates, especially children. In Germany the care of the sick is accomplished to a great extent by its 3000 dispensaries. However, this number is inadequate. It is not only impossible, but unnecessary, to require the reporting of incipient or suspected cases. Actual infectious cases of laryngeal and pulmonary tuberculosis should be reported, as also fatal cases of the disease. In order to avoid the popular fear and dislike of reporting to police authorities it is best to report the disease to health departments. It is also necessary to report changes of residence of those sick with tuberculosis. At least such occupations should be prohibited that require contact with children (nurse maids, etc.). Tuberculous children must be rigidly segregated from the well. The final disinfection of all objects, possessions, furniture, bedding, excreta, expectoration, etc., must be most rigidly carried out, and none of these objects should be permitted to be used or sold before being disinfected as prescribed by the laws of Germany.—*Die Bekämpfung der Tuberkulose durch die Gesetzgebung, Möllers, Zeitschr. f. Tuberk., October, 1921, xxxiv, 713.*

Governmental Care of Tuberculous Ex-service Men in Germany.—The new law enacted by the German Government, December 5, 1920, for the benefit of its disabled soldiers, takes into account three phases of the care of ex-service men, namely, medical care, social care and pensions. Medical care is put entirely into the hands of the workmen's sick-fund, whether the soldier be a member or not. If the person requires sanatorium or hospital care the government makes use of all available institutions for that purpose, for no government sanatoria or hospitals exist in Germany. Social care consists in reëducation of ex-service men in work suitable to the tuberculous and aids them in securing employment. It likewise embraces the care and support of the families of tuberculous ex-service men. The pensions are awarded on the basis of the extent of the soldiers' disability.—*Versorgung tuberkulöser Kriegsbeschädigter, Martineck, Zeitschr. f. Tuberk., October, 1921, xxxiv, 704.*

Phases of Tuberculosis Problem in Europe and United States.—The tuberculosis problem of to-day in Europe, outside of England, is appalling. The war and subse-

quent disorganization of government is chiefly responsible. In Russia no statistics are available and the present death rate will never be known. In Serbia very little is being done to combat the disease; the mortality is about 10 per 1000 and 10 in 100 are ill with tuberculosis. In Roumania the mortality is 31 to 32 per 10,000 inhabitants. Greece has established an educational centre, one dispensary and a hospital-sanatorium at Athens. In France, particularly, a most energetic crusade has been carried on for the past few years. Belgium, Italy and the Netherlands have inaugurated active campaigns. Tuberculosis is on the increase in Spain where the housing problem is acute The Scandinavian countries have a remarkably low death rate. In Germany several important tuberculosis institutions have been closed; but here and in Austria the governments are taking active steps, notification is being enforced and the masses are being educated through lectures by university professors. In Berlin the tuberculosis death rate is now half what it was during the war. German tuberculosis patients have formed an organization to look after their interests. In the United States the outlook is hopeful, although reports indicate that in a city like New York 53 per cent of the tuberculous are not under medical care. In United States government hospitals, 59,903 tuberculous ex-service men and women were cared for up to February 1, 1922. A list of government hospitals is given and the service of the institutions is commended. The present need is for added antituberculosis education in elementary schools, high schools and colleges, periodical examination of all pupils, maternity sanatoria for tuberculous mothers, more preventoria for children and more workshops for the partially recovered tuberculous patients.—*The Present Day Tuberculosis Problem in Europe and The United States, S. A. Knopf, Med. Rec., April 22, 1922, ci, 651.*

Employment for the Tuberculous.—Recommendations are made that the dispensaries assume the task of both advising tuberculous individuals as to the employment they ought to engage in, and of securing suitable employment for them. The tuberculous patient is instructed to try to come to an understanding with his employer as to the possibility of reinstatement in his position after cure has been effected, and to notify the dispensary as to the outcome of the negotiation. If the employer agrees unconditionally to take back the employee the matter is put into writing and signed by the employer. If the employer is disinclined to reëmploy the tuberculous person or refuses outright to do so, the latter notifies the dispensary which then requests of the employer his reasons therefor or tries to prevail on him to reconsider his decision. If the patient's condition makes it necessary for him to change his employment, the dispensary then endeavors to obtain suitable employment by advertising. If the patient as a result of his condition requires instruction in a new occupation, he is given over to a governmental department created for the reëducation of disabled soldiers.—*Berufsberatung und Berufsversorgung, Beschorner, Zeitschr. f. Tuberk., October, 1921, xxxiv, 697.*

Occupation and Tuberculosis.—We must make a distinction between a case of pulmonary tuberculosis due to childhood infection which is provoked into activity by occupation and a case due to massive reinfection of the worker in the factory. In the former the occupation *per se* causes a flaring up of a process already present from childhood; in the latter the active tuberculosis is caused not so much, if at all, by the occupation but merely by an accident of circumstances such as careless expectoration by tuberculous workmen in the shop. Besides these direct causes of occupational tuberculosis, there are indirect causes, such as poor wages and consequent poor housing, poor food, scant clothing, etc. Only cases of the first kind should be considered as occupational tuberculosis. The main occupational cause of activation of a quiescent tuberculous process is dust. Only certain types of dust, however, are responsible for the activation of a latent tuberculous process, namely, dust that remains in the lung tissue, such as quartz and silica; whereas coal dust is in great part transported from the lung by the phagocytes and the lymph channels. Of 1800 persons examined, 100 were stone masons, 1000 porcelain workers, 100 ball-bearing grinders, and 600 workers in cement, with a percentage incidence of siderosis of 63, 45, 30 and 15, respectively. Siderosis often activates a latent tuberculous process but the percentage in the above mentioned workers was not ascertained.—*Tuberkulose und Arbeit, Koelsch, Zeitschr. f. Tuberk., October, 1921, xxxiv, 581.*

Tuberculosis in Relation to Industry.—We require, first and foremost, a standard method of classification of tuberculosis and, next, its intelligent application by medical men before we can hope to reach final conclusions as to epidemiology and base on them an adequate system of prevention. In considering the fundamental factors of infection and resistance three propositions

are laid down. 1. In the populations of industrial centres infection tends to take place early, to be frequently repeated and to be almost universal shortly after the age of puberty. 2. In town populations there are many persons in sufficiently good health to engage in industry and to lead a normal life who are nevertheless suffering from clinically evident tuberculosis. 3. The presence of latent infection leads to a considerable degree of resistance against reinfection as well as providing a barrier against autoinfection. The power of the animal body to "adapt itself" to its parasites is well recognized; likewise the susceptibility of certain groups to the disease of a new environment. Thus the Shilluk remains healthy at Fashoda, but send him to Cairo and it is heavy odds that he will soon die of acute tuberculosis. There are intermediate stages of adaptation shown, by a comparison of rural and city populations. In big towns the proportion of fatal cases to total infections is low while in the rural districts it is relatively high. In industrial populations where most of the people harbor latent tuberculosis the real question at issue is whether reinfection or autoinfection is the more common. Primary infection, which runs a rapid course, is unlikely. In favor of the idea of recrudescence of old infection is the fact that the incidence of and mortality from tuberculosis did not vary from their usual level in soldiers serving at the front during the war, although careful medical examination had weeded out infectious cases. The experiments of Baldwin and others are also in line with this. The "adjuvant" action of certain dusts met with in many industries and trades must also be considered, since exposure to them, especially silica dust, leads directly to an inordinately high tuberculosis death rate. The mode of action is uncertain, one reason being that it is extremely hard to separate pneumonokoniosis from pulmonary tuberculosis on grounds of physical signs. But, whether dust inhalation opens the way for fresh infection or whether it arouses to activity old infections, the fact remains that lungs injured by silica dust are more vulnerable than healthy lungs to tubercle bacilli. Other factors that have an etiological bearing are bad housing, unsuitable conditions of work, crowded rooms, unhealthy temperatures, bad ventilation, defective sanitary appliances, poor food, want of open air exercise and a resort to indoor amusements and alcoholic and other excesses. Hard work does not matter because it is beneficial in accelerating metabolism and other functions. In the low phthisis death rate among miners we see beneficial effects of hard muscular work together with good wages and a high standard of living. In contrast, the rate is high among tailors and shoemakers whose mode of life violates the laws of physiology. In a variety of trades Brownlee's studies have shown that the apex of highest mortalities among males is at or about fifty years, while among females in England and Wales it is between 30 and 40. But among women workers in munition factories during the war Greenwood showed that the maximum mortality was between 15 and 20 years. The evident explanation of these differences is that the males are as a rule relatively resistant because of the frequently repeated mild infections incident to the conditions in which they grow up, while the females quitting domestic surroundings for an industrial life come without previous adaptation to the bacterial flora of the workshop and the loom. It is probable that, with the greater industrialization of women, the female death rate will in the future tend gradually towards the "middle age" type of Brownlee. Infants and young children will be in the greater danger the more the women participate in industrial life and in the pooling of pathogenic germs incident thereto. For preventive purposes occupations may be divided according to those in which infection plays a relatively small part and according to those in which it may play a very important rôle. In the first category are those industries where males are chiefly employed and where conditions of work do not facilitate infection. Good working and home conditions should be provided to avoid recrudescence of old infection. The second group includes occupations involving exposure to dangerous dusts and the employment of females soon after adolescence. Here it is imperative to carefully exclude infectious cases. Finally, children should be most carefully protected. The urgent importance of legislation to exclude infectious teachers from schools is too often forgotten. Such legislation accompanied by some form of compensation should be advocated.—*Tuberculosis in Relation to Industry, S. L. Cummins, J. State Med., January, 1922, xxx, 4.*

Tuberculosis Mortality of Porcelain Workers of Thüringen—Porcelain dust, on account of its insolubility, acts as a foreign body irritant in the lungs after prolonged inhalation and eventually produces chronic foreign body changes. In all the districts of Thüringen the porcelain workers suffer from chronic pulmonary diseases. Dust inhalation, as such as well as silicic acid, protect against the severity and spread of pulmonary tuberculosis. According to the

experience of a number of contract physicians, porcelain workers are afflicted only with a slow, favorable type of tuberculosis. Earlier studies revealed that the tuberculosis prevalence among the porcelain workers of Meiningen was greater than in the remaining states and in Schwarzburg-Rudolstadt where the lowest mortality obtained. The average mortality figure for male porcelain workers over 15 years (including invalids) was 1.4 per cent for Meiningen, and 1.02 per cent for Rudolstadt. The average age of death was 48.25 years in Meiningen and 54.55 years in Schwarzburg-Rudolstadt. The tuberculosis mortality reaches a high figure in Meiningen, but not as high as is generally thought to be the case. In Rudolstadt the porcelain workers are not incapacitated more often than are employees in the other industries. A large portion of the porcelain workers die of diseases of the respiratory organs. Among the workers pulmonary tuberculosis is more prevalent in Meiningen than in Rudolstadt. In Meiningen 61 per cent of all deaths among porcelain workers was due to diseases of the respiratory organs, 38 per cent from tuberculosis, and in Schwarzburg-Rudolstadt only 31 per cent from diseases of the respiratory organs and 21 per cent from tuberculosis. The tuberculosis mortality figured from the living was in Meiningen 0.57 per cent, in Rudolstadt only 0.24 per cent. The social and hygienic conditions under which the workers in Meiningen and Rudolstadt live were markedly different, and this explains the great difference in tuberculosis mortality among the same workers in the different localities. The author accounts for the high tuberculosis incidence of Meiningen by the poor social and hygienic conditions outside of the factory and recommends an energetic improvement of environmental conditions of the worker.—*Die Tuberkulosesterblichkeit der Porzellanarbeiter Thüringens, L. Vollrath, Beitr. z. Klin. d. Tuberk., April 11, 1921, xlvii, 237.*

Industrial Medicine and Tuberculosis in Germany.—Since the rehabilitation of the German people depends upon the workman and since his efficiency depends upon his well being the motto must be "Let hygiene reign supreme in the workshop."—*Betriebsrat und Tuberkulosebekämpfung, Thiele, Zeitschr. f. Tuberk., October, 1921, xxxiv, 711.*

The War and Pulmonary Tuberculosis.—Not a single definite, primary infected case was found among 1063 war consumptives. The view of Zodek and Reiche on the prevalence of primary war infections could not be substantiated. Diminished resistance and autoreinfection occasioned the disease among the soldiers.—*Krieg und Lungentuberkulose, K. Krause and L. Creischer, Beitr. z. klin. d. Tuberk., April 11, 1921, xlvii, 209.*

Tuberculosis Epidemic in Siberia.—In two prison camps an epidemic of tuberculosis occurred, in which 2000 cases developed, within 9 months, among previously healthy, clinically tuberculosis-free German and Hungarian soldiers. The disease progressed rapidly, and in 20 per cent of the cases led to death in from one to three months with enlarged cervical and bronchial lymph nodes, exudative-hemorrhagic pleuritis, pericarditis, peritonitis and intestinal hemorrhages. Guinea pigs inoculated with the exudate died of tuberculosis. At postmortem the bronchial nodes were markedly enlarged, while the lungs were not involved. Evidence of healed childhood tuberculosis (calcified nodes) was common. An exogenous origin could be definitely excluded. The diminished resistance due to war prison conditions led to a flaring up of latent lymph node foci.—*Tuberkulose-Epidemie in Siberien, K. Planner-Wildinghof, Beitr. z. klin. d. Tuberk., April 11, 1921, xlvii, 212.*

Italian Studies of Human and Bovine Tuberculosis.—Under the direction of Professor Gosio several Italian bacteriologists have carried out investigations in the Public Health Laboratory at Rome on the comparative virulence of human and bovine tubercle bacilli and their rôle in the diffusion of human and bovine infection. All their experiments point to the specific separateness of the two bacterial types. Jatta and Cosco conclude that: The guinea pig is equally susceptible to human and bovine bacilli. Rabbits are nearly resistant to human tuberculosis germs; inoculated with bovine virus they contract a diffuse tuberculosis, mainly pulmonary and renal. The cat is resistant to human tuberculosis or suffers only local lesions; bovine tuberculosis gives rise to diffuse lesions. Dogs are resistant to both germs. In the sheep and pig bovine tuberculosis produces generalized lesions; these animals are immune to human tuberculosis or they acquire lesions only at the point of inoculation. The domestic fowl is refractory to both forms. Human virus inoculated subcutaneously into the bovidae results in swelling and abscess, the caseous pus of which contains bacilli virulent for the guinea pig. The lesion disappears without extending to deeplying organs which never suffer, whatever the avenue of infection. Human tuber-

cle bacilli, injected intravenously into the cow, leave, eight months later, no traces of an infection which at first produced transitory trophic disturbances. After fifty days, on the contrary, gray tubercles in process of regression are found in the lungs. Eight, ten and fourteen months after inoculation the animals are healthy or have only slight, local, healing lesions. Inoculation of human bacilli into the anterior chamber of the eye or into the cornea produces only local lesions in cattle. Inoculation of bovine bacilli into the bovidae, whatever the method of inoculation, always produces progressive, fatal tuberculosis. Breeds reared in the country and fine breeds kept in stables are equally resistant to human tuberculosis. Human virus remains inactive for cattle after twenty passages through the guinea pig, after eight through the pig and rabbit and after it has been taken from a two months old, local lesion of the cow. The effect on the cow of the two types of bacilli is independent of the degree of their specific virulence. None of the evidences of identity of the two germs—the possibility of immunizing the cow against bovine tuberculosis with human bacilli, identical behavior of tuberculin prepared with the two germs, agglutination—has absolute value. Natural infection of cattle is from animal to animal and infection through human beings does not occur. Likewise human infection is from man to man without the intervention of bovine tuberculosis. The two types, consequently, differ in their pathogenic properties. As a rule, each bacterium is found living only in its own host. Gosio studied the virulence of the bovine bacillus for monkeys. Cultures administered by mouth produced fatal tuberculosis, evolving in from four to six months; but he was unable to infect monkeys by repeated ingestions of milk from a tuberculous cow with no lesions of the udders, although such milk usually contains great numbers of bacteria, acquired through contamination. The differentiation of the two types of tuberculosis is based on the pathogenic action of the germs in the rabbit. By inoculating large numbers at one time accidental variations in the character of the infection become negligible, and the results show that the creation of an intermediate class of atypical bacteria is not justified. Rabbits inoculated under the skin with both human and bovine tuberculosis begin generally by increasing in weight. After thirty or forty days the animals inoculated with bovine virus lose weight rapidly and die extremely emaciated. Intravenous injection causes loss of weight from the beginning. No loss of weight occurs in rabbits inoculated with human tuberculosis. In rabbits the evolution of the disease is not appreciably affected by life in the open; both indoors and out the mean time of survival was four months. The Italian workers have used culture media as a means of differentiation between human and bovine tuberculosis. Arbutin in weak solution is not antiseptic for tubercle bacilli. Under the influence of a diastase this substance is decomposed into glucose and hydroquinone which, when oxidized in contact with the air, gives a brown color. The brown color appears early and increases rapidly in bovine cultures, whereas in cultures of human tuberculosis, although growth is there more rapid, the brown color appears much later. In all the cases of human tuberculosis studied the causal agent was a bacillus of the human type. In fifteen cases of skin tuberculosis of different sorts the human bacillus was always observed. Two of the isolated strains were abnormally virulent for rabbits, although of the human variety. Several strains were isolated which showed diminished virulence for guinea pigs and rabbits (Gosio and Viraldio). A bacillus of bovine type was isolated by Gosio, Rosa and Benedictis from a skin lesion in a veterinary which developed after a wound made by a soiled knife. This observation furnished a demonstration that bovine virus inoculated under the human skin tends to remain isolated and to heal. After three months in the human lesion the bacillus conserved its virulence for the cow. The effect of tuberculin on the secretion of milk causes a slight loss. The relative incidence of human and bovine tuberculosis in different provinces was made the object of study. Sardinia has the highest rate of human tuberculosis, the mortality being said by Jalta, Coriga and Maggiora to be 2.30 per 1000. Women are more affected than men, among whom those who work in the fields and in the care of animals are least affected. In some communes there are groups of houses in which tuberculosis is apparently endemic and in which transmission by contact seems certainly demonstrated. The bacilli isolated from different forms of the disease in these houses belonged to the human type. Only four strains were found with an abnormal virulence for rabbits, but these gave the human type of reaction in cattle. Bovine tuberculosis is very rare in Sardinia and the cases observed were among imported cattle. Sardinian cattle were more resistant to experimental tuberculosis than other cattle and they can be considered in some measure refractory to natural infection. The milk was never found infected. In Lombardy both diseases are very prevalent but are not usually coincident in the same regions. Human tu-

berculosis has the lowest mortality in the regions where bovine tuberculosis is most abundant and where dairy industries are the largest. The highest mortality from intestinal, peritoneal and mesenteric tuberculosis, in relation to the mortality from other forms, occurs among children of industrial regions where contact with cattle is least frequent and bovine tuberculosis most rare. The mortality from tuberculosis in children is not greater in agricultural than in industrial regions. It is greater in agricultural regions with few cattle and little bovine tuberculosis than in agricultural regions with great dairying industries and much bovine tuberculosis. The mortality rate is highest among the workers of the great industrial establishments, and very low among populations living in contact with infected cattle and consuming raw milk. It has been claimed that shepherds and their families possess a vaccinal immunity against tuberculosis, but these persons contract tuberculosis and die of it like others. Nineteen tuberculous persons who appeared exposed to bovine infection showed only human tubercle bacilli. The possibility of transmission of bovine tuberculosis to man is not considered absolutely excluded, but its possible occurrence is considered as a negligible exception. Prophylaxis of human tuberculosis may be limited to protection against human infection and to suppression of familial contagion which is the chief source of infection.—*Sur les rapports entre les bacilles tuberculeux humain et bovin d'apres les travaux italiens. Revue critique, A. Boquet, Rev. d. l. Tuberc., December, 1921, ii, 485.*

Diathesis and Tuberculosis.—The immunobiology of tuberculosis cannot account for the considerable variation in individual resistance to the disease, this being explicable only on the basis of individual diathesis.—*Konstitution und Tuberkulose, J. Bauer, Zeitschr. f. Tuberk., October, 1921, xxxiv., 615.*

Modes and Sources of Tuberculous Infection.—This is a critical review of work published since Behring's declaration in 1903 that the intestinal tract is the main avenue of infection in the infant, with tuberculous milk as the source of the infection.—*Ansteckungsquellen und Ansteckungswege, Reichenbach, October, 1921, xxxiv, 559.*

Tuberculosis of Dusty Trades, Especially Porcelain Industries—The general view held by physicians and laity in Thüringen, regarding porcelain worker's disease being nothing but tuberculosis, is opposed by postmortem findings. Certain dusts are protective against tuberculosis. The power of the mucous membranes to rid themselves of dusts varies with the types of dusts inhaled. Dusts can produce a nonspecific inflammation aiding in resisting infection. Finally, certain chemical substances, with or without pulmonary inflammation, can raise the tissues' resistance to tuberculosis. With porcelain dust more of these protective factors come into consideration, especially the protective nonspecific inflammatory reaction and the presence of a useful chemical substance. Silicic acid no doubt acts favorably upon encapsulation. Of 45 porcelain workers examined postmortem, only 6 died of pulmonary tuberculosis. In 20 cases marked pneumonokoniosis was found, and 8 had chronic, nontuberculous pulmonary disease. Porcelain dust pneumonokoniosis and acute phthisis were not found together. Silicic acid therapy is advocated and even its necessity as a foodstuff in diseased conditions, it being invaluable in aiding the formation of tuberculous scar tissue.—*Über die Tuberkulose der Staubarbeiter, im besonderen in Porzellangewerbe, R. Rössle, Beitr. z. Klin. d. Tuberk., April 11, 1921, xlvii, 325.*

Domestic Animals as Sources of Tuberculous Infection.—In 1913 and 1914 Joest examined, postmortem, 4683 dogs and 933 cats at the Berlin pounds. He found no cases of tuberculosis in dogs under two years of age. Of the entire number of dogs, 75, or 1.6 per cent, were found to be tuberculous. The mode of infection in more than half of the dogs was thought to be by inhalation; the rest by ingestion. Of the above number of cats, 110, or 11 per cent, showed signs of tuberculosis. In 1920–1921 Joest sectioned 771 dogs and 34 cats. The organs found suspicious in these animals were examined by the writer microscopically and culturally on Dorset's egg medium, with and without the addition of glycerin, and on glycerin-potato tubes. After the cultures had accustomed themselves to artificial media they were transplanted to glycerin-agar and bouillon. Good results were attained with Haswell Wilson's modification of Dorset's medium in which, instead of adding water to the egg, the fluid from trypsinized horse heart is added. Of 31 dogs suspected of tuberculosis, 19 were found by the above methods of isolation and by guinea pig and rabbit inoculation to be unquestionably tuberculous. Of the 19 strains of tubercle bacilli isolated, 16 were found to be human, 1 bovine, and 2 atypical. The atypical strains at first grew very sparsely, later more abundantly. Both animals from

which the latter were isolated were rather old—5, 6 and 12 years of age. It was this that suggested the possibility that these atypical strains may have been bovine bacilli in the stage of transition to human bacilli, as brought out by Orth in 1913. Of the 6 suspected cats, 3 showed infection with human and 2 with bovine bacilli. Of 2 suspected goats the lungs in one was infected with bovine, in the other with human bacilli. Since 1914 the incidence of tuberculosis among domestic animals has increased in dogs from 1.6 to 2.4 per cent, and in cats from 11 to 14.7 per cent.—*Die Bedeutung der Haustiere für die Verbreitung der Tuberkulose, Lydia Rabinowitsch-Kempner, Zeitschr. f. Tuberk., October, 1921, xxxiv, 570.*

Value of Pirquet's Test in Etiology and Epidemiology of Tuberculosis.—Of 180 children up to the age of 14 years that were suspected of tuberculosis, 42 per cent reacted positively, 28.9 per cent to O. T., Höchst (constant and high amount of toxins), and 7.8 per cent to B. T.: 18.4 per cent responded more intensely to O. T. than to B. T., 36 per cent reacted equally to O. T. and B. T., while in 7.9 per cent the reaction to B. T. was more severe than to B. T. A superiority of B. T. to O. T., therefore, cannot be claimed. The markedly diminished immunity of the city population of Berlin on account of underfeeding may account for the small number of positive reactions obtained. The apparently contradictory findings on the material of Rostock (preponderance of bovine over human tuberculin reactions) and Berlin may find an explanation in better veterinary supervision of the milk in Berlin which diminishes the opportunity for infection with bovine tubercle bacilli.—*Zur Bewertung der Pirquetischen Kutanreaktion in aetiologischer und epidemiologischer Beziehung, Kretschmer, Deutsch. med. Wchnschr., April 28, 1921, xlvii, 465.*

Tuberculosis and Pregnancy.—In tuberculosis the question often arises as to when pregnancy should be terminated. It must be recalled that in so called latent tuberculosis 80 per cent of cases go through pregnancy, labor and puerperium without aggravation of the process, while 10 per cent are activated during pregnancy and 20 per cent during the puerperium. Hence, constant watchfulness on part of the physician is necessary. If the tuberculous process has become manifest during pregnancy the procedure to be followed depends upon the extent of the disease. If the case be Turban I the physician's responsibility is great if he adopts the expectant treatment of the pregnancy. If it be Turban II, pregnancy is a grave complication, in which the process is aggravated in 80 per cent of cases: hence, termination of pregnancy is absolutely indicated. Termination of pregnancy brings about improvement in 80 to 90 per cent of cases in Turban I and II. For Turban I cases abortion by the vaginal route is advisable. Tube sterilization in these cases is not indicated because the tuberculous process will heal. With Turban II cases the best method is the total extirpation of the uterus and of the adnexa by the abdominal route under sacral anaesthesia. The advantages enumerated for this method are: No inhalation narcosis, loss of blood, danger of infection, thrombosis or embolism, an afebrile postoperative course, no danger of miliary tuberculosis, an elimination of the puerperal state, no menorrhagia, and no danger of future pregnancy. For Turban III cases total extirpation is almost worthless; at most, perhaps slight prolongation of life occurs.—*Tuberkulose und Schwangerschaft, E. Kehrer, Zeitschr. f. Tuberk., October, 1921, xxxiv, 393.*

Miliary Tuberculosis in Stillborn Fetus.—To a total of 113 authentic and 519 more or less doubtful cases of prenatal tuberculosis, R. C. Whitman and L. W. Greene have been able to add a number of cases from the literature and one case from their own experience. The autopsy report of this infant showed that there were widespread, firm, banklike adhesions in the pleural cavities. The lungs were studded with innumerable calcareous nodules. There were many small grayish-white nodules throughout the cortex and medulla of the kidneys. There was a large amount of caseous material in the medulla of the adrenals. Macroscopic lesions were also present in the left ovary, both lateral ventricles and in the anterior part of the thalamus. Microscopically, the lungs were found to be thickly set with tubercles, varying greatly in size and stage of develop, ment. The spleen, pancreas, suprarenals, ovary, kidneys, liver and placenta contained tubercles. The mother had had five children, four of whom died from influenza. The examination made at the dispensary, previous to confinement, revealed no active tuberculosis, but one made at the time of delivery revealed an area of dulness with râles at the right apex. This collection of cases is imposing enough to lift prenatal tuberculosis out of the class of medical curiosities and to stimulate consideration of the broader aspects of the queation.—*A Case of Disseminated Miliary Tuberculosis in a Still-born Fetus, R. C. Whitman and L. W. Greene, Arch. Int. Med., February, 1922, xxix, 261.*

Occult Tuberculosis Among Children of Dortmund.—Intractutaneous tests of 992 children of the working classes were done between January, 1918, and October, 1920. One hundred and forty children were from orphanages. In 23 of the latter with positive reactions the father or mother had died of tuberculosis. One hundred and twenty-three of the total number had manifest tuberculosis. The positive results obtained in the remaining 869 children were lower than the figures given from the children of Munich and Charlottenburg. Six per cent were infected at two years, nineteen per cent at five to six years, and 50 per cent at thirteen to fourteen years. The low percentage of tuberculous people in Dortmund accounts for the favorable figures obtained. The latter fact is confirmed by 811 postmortems by Schnade, who found that 124 or 27 per cent disclosed macroscopic tuberculosis, while the mortality percentage was 15. The corresponding figures given by Naegeli are 40 per cent and 21 per cent.—*Über die Verbreitung der okkulten Tuberkulose unter den Kindern in Dortmund, Sander, Deutsch. med. Whnschr., May 12, 1921, xlvii, 532.*

Tuberculous Infection among Children in Private Practice.—As part of a thesis for his doctor's degree, Brüning had W. Blume perform Pirquet tests on 350 children in private practice, from among the better class of people. The tests were done routinely on unselected cases, and not because of any suspicion of tuberculosis. Of the 350 children, 26 per cent reacted positively, the distribution of the positive results by age being as follows:

	per cent		*per cent*
0–1 year.....	6.3	7– 8 years....	29.0
1–2 years.....	21.4	8– 9 years....	40.9
2–3 years.....	16.7	9–10 years....	42.1
3–4 years.....	19.2	10–11 years....	46.4
4–5 years.....	18.8	11–12 years....	28.6
5–6 years.....	36.0	12–13 years....	35.3
6–7 years.....	36.8	13–14 years....	46.2

Divided into age groups, of 79 infants, 6.3 per cent reacted positively; of 105 children of preschool age, 22.9 per cent were positive; and of 166 school children, 47.4 per cent gave positive tests.—*Zur Frage der Tuberkuloseinfektion bei Kindern der Privatpraxis, H. Brüning, Jahrb. f. Kinderhk., November, 1921, xcvi (3rd s. 46), 286.*

Tuberculosis among School Children.—In the diagnosis of tuberculous infection in children the roentgen ray is usually the deciding factor. Of 720 children examined physically, 230 were X-rayed. The results of examination were classified into three groups: 1. Cases in which there are present, clinically and roentgenologically, demonstrable tuberculous peribronchial nodes and signs of activity, as seen from coalescing cervical nodes, tuberculous ocular affections, temperature, habitus phthisicus, etc.: 22.88 per cent belonged to this group. 2. Cases that showed no local signs but only general symptoms of tuberculous infection. Roentgenologically, however, hilum changes and calcification of the peribronchial nodes could be seen. This group formed 42.44 per cent and could really not be considered ill. 3. Cases that manifested no local signs excepting slight peribronchial thickening, nor general symptoms at any time. These are children who will react to tuberculin or to partial antigens: they form 34.68 per cent of the total.—*Zur Frage der tuberkulösen Infektion im Schulalter, I. Ivancévie and M. Pinner, Zeitschr. f. Tuberk., January, 1922, xxxv, 351.*

Prevention of Tuberculous Infection in Children's Hospital.—There is no longer any doubt that the vast majority of persons with tuberculosis receive infection by way of the lungs. Infections through the alimentary canal and skin occur, but are rare. Moreover, the danger from droplet infection is much greater than through the inhalation of infected dust, etc., as has been demonstrated by animal experiment and clinical experience. There seems to be little doubt that in many children the first infection, without subsequent reinfection, progresses to a fatal termination, and the younger the child, the higher the mortality. Therefore, it is exceedingly important that all children who have bacilli in their sputum be isolated from those with negative tuberculin tests, and that careful supervision of physicians, attendants and visitors be instituted. For children who remain in bed, isolation by means of cubicles (glass walls between adjacent beds) is sufficient.—*Beobachtungen über die Tuberkuloseinfektion und ihre Verhütung in Spitälern, K. Peyrer, Arch. f. Kinderhk., 1921, lxix, 419.*

Vital Capacity of Lungs in Children.—In recording the vital capacity in children the following instructions are given: The child is seated comfortably erect with shoulders back and is instructed to take the deepest possible inspiration (breath), and to blow it immediately into a spirometer (the mouthpiece being held tightly between the lips), until all the breath is gone (empty feeling). The highest number of cubic centimetres reached in from three to five satisfactory tests is accepted as the vital capacity in

cubic centimetres. In a study of a group of 362 children, from six to sixteen years of age, a normal standard of 1.93 litres per square metre of surface area, allowing a plus or minus 10 per cent deviation (giving a normal range of from 1.74 to 2.12 litres), has been established. The vital capacity may be read off a chart in litre per square metre of surface area and in percentage of normal at sight. A normal standard of 15.5 cc. for each centimetre in height has also been indicated as another method of relating the vital capacity measurement. Boys show vital capacity 6 per cent greater than girls. Extremes of age give values at the lower and higher limits of the normal range established. The colored race shows a definitely lowered vital capacity. Poverty, environment and social status do not seem appreciably to influence the figures. Activity and athletics tend to increase the vital capacity. Malnutrition and underweight for height do not lower the capacity. Overweight for height reveals an apparent reduction of vital capacity per square metre of surface area. Vital capacity measurement is a fairly constant one. A reduction of vital capacity measurement of 15 per cent or more from the average normal standard should single the child out for further physical and roentgenographic examination.

Summary of clinical conditions that reveal diminished vital capacity in children

DIAGNOSIS	REDUCTION OF NORMAL VITAL CAPACITY.
	per cent
Tracheobronchial adenopathy	20–30
Acute bronchitis	10–20
Bronchial asthma (between attacks)	0–30
Emphysema	10–15
Pleurisy with effusion	30–40
Lobar pneumonia	40–50
Pulmonary tuberculosis	30–50
Organic heart disease:	
Class 1: Normal exercise tolerance	0– 3
Class 2: Diminished exercise tolerance	20–35
Class 3: Cardiac failure	35–80

Conclusions: 1. Vital capacity measurements should be recorded on routine physical examination. 2. The determination of vital capacity of the lungs in children is indicated as a practical and valuable diagnostic measure.—*Diagnostic Value of Determining Vital Capacity of Lungs of Children, May G. Wilson and D. J. Edwards, J. Am. M. Ass., April 15, 1922, lxxviii, 1107.*

Tuberculosis in Children.—The prophylaxis of tuberculosis in adults must begin in childhood.—*Die Tuberkulose des Kindesalters, H. Rietschel, Zeitschr. f. Tuberk., October, 1921, xxxiv, 636.*

Protecting Children from Tuberculous Infection.—The motto that must be followed in prophylaxis is that the right of the child to health outweighs the right of the parents to the child. The adherence to this motto is especially difficult when a child should be removed from its family, in which case forcible removal is justifiable and should be carried out when there is an open case of pulmonary tuberculosis in its family.—*Über den Schutz des Kindes vor der Ansteckung mit Tuberkulose. Ein Beitrag zur Technik der Familien-Sanierung, F. Ickert, Zeitschr. f. Tuberk., June, 1921, xxxiv, 355.*

X-ray Diagnosis of Pulmonary Disease in Children.—In trying to establish what constitutes a normal lung picture in childhood a series of children were examined between the ages of one day and eighteen months. As early as the first day very tiny circular shadows, about 2 or 3 mm. in diameter, were seen at the ends of the major divisions of the bronchi. These were probably not atelectatic because they persisted, became more clearly defined and, as time went on, the divisions of the bronchial tree became more and more in evidence, so that at the end of a few months the major divisions of the bronchi could be easily made out. Those children who suffered pulmonary infection showed upon recovery a much heavier outlining of the bronchial shadows. Those cases that developed tuberculosis showed no change before the sixth month. To attempt to determine when certain lung markings become of pathological significance, 80 children above the average in physical condition were examined, their ages varying from three to thirteen years. Forty-eight of the 80 cases showed changes in their lungs, which were regarded as pathological by the X-ray, whereas pathological changes were demonstrated by physical examinations in only 15 cases. Some of the lesions were so situated that they could not be detected by physical examination, but the number must lave been very small. Consequently, there should be a close collaboration between the roentgenologist and the clinician, and a diagnosis should not be given, much less any therapy suggested, upon the X-ray findings alone. Of the acute infections, acute bronchitis causes no X-ray changes. Lobar pneumonia is usually very easy to demonstrate, often beginning at the periphery of the lung. Bronchopneumonia is more difficult to

diagnose because it often leaves lasting changes. In its acute stage it is characterized by areas of consolidation of varying size with rather indefinite outlines, more frequently found at the bases. It is to be differentiated from tuberculous consolidation and metastatic sarcomata; the former more often springs from the mediastinum and is associated with large mediastinal nodes while the outlines of the latter are better defined and they are widely and regularly distributed through the lungs. In chronic bronchopneumonia the areas of consolidation may have cleared up, but there is a very extensive fibroid infiltration which outlines the bronchial tree, with thickened and dilated bronchi and groups of enlarged, dense nodes scattered throughout the lungs. In more severe cases there may be bronchiectasis and cavitation. Tuberculosis frequently gives just such a picture. In children tuberculosis may be seen in any part of the lung and is not uncommonly basal. As the child gets older and we find the disease in its less active form, we commence to see the localized fanshaped areas of infiltration that are associated with tuberculosis in adults. Enlargement of the mediastinal nodes is a very helpful diagnostic aid; in no other infection does the enlargement seem to be so marked. Healed or inactive tuberculosis leaves its marks in the lungs. A persistent thymus may cause an enlarged mediastinal shadow. The pulmonary changes associated with rickets usually occur within the first three years of the child's life when the disease is most active. X-ray examination of these cases shows marked deformity and increased porosity of the ribs, with marked enlargement of their anterior ends. The lungs show longitudinal shadows of irregular outlines, 1 or 2 cm. in width, extending from the clavicle to the base on both sides of the heart, from which they are separated by a narrow clear area. Numerous small areas of consolidation may be seen scattered throughout both lungs, and the whole field frequently presents a hazy appearance. The areas of consolidation may be so diffuse as to simulate tuberculosis and the longitudinal areas may be so large as almost completely to obscure the lung fields.—*Diagnosis Of Pulmonary Conditions in Children, J. W. Pierson, Am. J. Roentgenol., January, 1922, ix, 11.*

Sanatorium Treatment of Tuberculous Children.—Present sanatoria accomodations for children are inadequate in comparison with those provided for adults; this in spite of the reported high rate of incidence of tuberculosis in children. Morbidity figures vary; but they indicate that almost any large city in the country could furnish enough tuberculous children to fill all the existing tuberculosis sanatoria in the land. Chadwick found seven per cent of the school children in Westfield, Massachusetts, definitely tuberculous. Griffin, from his experiences among school children in Norwood and Sharon, Massachusetts, estimates that at least one in 1000 children has tuberculosis, demonstrable by dulness and râles; on this basis there is a minimum of 20,000 tuberculous children in the country. If definitely infected cases with enlarged lymph nodes, a positive tuberculin reaction and perhaps general poor nutrition or anemia were included the task would be stupendous. If, as we must admit, tuberculosis practically always starts in childhood, the way to eradicate it is not by sanatorium care of adults but by preventive care in childhood. Among the measures that will prove effective are the open air school, the Grancher method of farming out, the scout idea and the health crusader movement. For "masked tuberculosis" sanatorium care is indicated. In some localities even the few beds available for tuberculous children are not all filled. This is probably because the family does not care to make the expenditure when evidence of the disease is no more obvious and because they hesitate to place their children under the control of strangers. It will be necessary therefore, to educate not only the public but also the pediatricians and the profession at large; in America, at least, if the need of care of tuberculous children is really made evident, institutions will be forthcoming.—*The Need of Sanatorium Treatment of Tuberculous Children, W. A. Griffin, Boston M. & S. J., March 9, 1922, clxxxvi, 316.*

Sanatorium Treatment for Children in Germany.—There are in Germany 168 sanatoria for adults with a total of 17,600 beds, and 172 sanatoria for children with 14,300 beds. Most of the children in these institutions are, however, of the latent and scrofulo-tuberculous types. The prevailing treatment in these institutions consists of open air therapy, combined with heliotherapy and exposure to artificial light, purposeful exercise and tuberculin. The length of exposure to the open air is dependent upon the time of the year and the climate. Except for children who are hypersensitive to cold, the open air treatment can be applied on the average for ten hours during the summer and from five to six hours during the winter. From April to October about 20 per cent of the children can sleep out of doors all night. Indications for rest in bed are more elastic in children than in adults when the lungs are not involved. Exercises are chosen to bring all muscle groups into

play, such as dancing, rhythmic gymnastics, seesaw and gardening. All exercises should be combined with air baths which is accomplished by surrounding the solarium with a board fence which also acts as a protection against wind and permits air bathing from March to November. Of 25 cases of cervical node tuberculosis, no matter of what stage, whether merely swollen or caseous, all were cured with sun and roentgen ray treatment. Present methods of chemotherapy are not to be recommended at all for children. Sanatoria for children should admit children with all forms of tuberculosis, provided they can be improved by proper treatment. The mildest cases may improve sufficiently in twelve weeks, after which they may be discharged; but more severe cases should receive at least from four to six months' sanatorium treatment.—*Über die klinische Behandlung der Kindertuberkulose mit besonderer Berücksichtigung der Kinderheilstätten. G. Simon, Zeitschr. f. Tuberk., October, 1921, xxxiv, 648.*

Hip Joint Tuberculosis in Childhood.—Prior to two years of age tuberculous disease of bones and joints is the exception. Surgical tuberculosis is primarily confined to one part, and if multiple foci develop they occur after a varying length of time has elapsed from the appearance of the first focus. The age of election is between two and fifteen years. The onset is insidious and the progress is chronic. There is usually a history of slight injury having occurred within a month and often there has been an attack of measles or influenza a few months before the onset of the disease. The symptoms of hip joint tuberculosis include intermittent limp, muscle spasm and limitation of motion. As the outer limits of the inflammatory area approximate the joint surfaces, motion becomes more and more restricted, and when the joint surfaces become involved all function ceases. There is no position of the leg which is constantly characteristic. Muscle atrophy may occur within the first week of onset and is more or less likely to be permanent. In the early stages there is apparent lengthening or shortening of the leg, depending on the position of abduction or adduction, respectively. Actual lengthening or shortening does not take place until there is destruction of tissue in the joint. Pain is a late manifestation and is most commonly felt on the inner side of the thigh and knee along the course of the obturator nerve. Movement of the joint during sleep when the muscles are relaxed may cause night cries. The temperature range is usually from 99° to 100.5°; if it reaches 102° or more, it is almost diagnostic of a nontuberculous infection. The X-ray shows typically an absorption of bone substance, but if the lesion has its origin in the synovial parts of the joint and the epiphysis of the bone is clearly outlined, there will be found a wider space between the surface of the head and the acetabulum because of the fluid in the joint cavity. There may also be found roughening of the surface of the cartilage of the head or of the acetabulum. In the differential diagnosis one must consider rheumatism, "growing pains," synovitis, genital irritation, epiphyseal infection, acute rickets, infantile scurvy, psoas muscle contraction, disease of the spine and knee and coxa vara.—*The Diagnosis and Differential Diagnosis of Early Hip Joint Disease in Childhood, J. T. Rugh, New York M. J., March 1, 1922, cxv, 256.*

Chronic Osteoarthropathy in Young Child.—The patient, a girl, aged 28 months, was normal at birth and developed normally except that she was slow in learning to walk and talk. When 22 months old she had rickets. Shortly after this, clubbing of the fingers was noted, but a roentgenogram did not disclose any bony abnormalities in the phalanges or metacarpals. Four months after the first observation the roentgenogram showed marked thickening of all the long bones and there was clubbing of the fingers and toes. The appearance could not be entirely explained on the basis of rickets or scurvy. A search for some primary focus of disease revealed nothing except a definite enlargement of the heart, but no murmurs or thrills were present.—*Chronic Osteo-Arthropathy: Report of a Case in a Child Aged Twenty-eight Months, C. H. Hyman and T. P. Herrick, J. Am. M. Ass., April 8, 1922, lxxviii, 1043.*

Edema and Intestinal Tuberculosis in a Child.—A case is reported of a girl, 5¾ years old, in which the outstanding features were severe diarrhea, bronchopneumonia and marked general anasarca of a type which suggested the so called "war edema." There was mild anemia, but heart and urine were normal. The blood protein was reduced to 3.5 per cent (normal, 7 to 9 per cent), but the nonprotein nitrogen and blood sugar were normal. The child complained of headache, and during the period of observation (16 days), developed one-sided convulsions and a paresis of this side of the body. There was a double choked disc for several days, but this, as well as the edema and paresis, lessened perceptibly before death, which occurred on the sixteenth day of observation. Autopsy showed a widespread ulcerative tuberculous process in small and large intestine,

pulmonary tuberculosis, tuberculous pleurisy and peritonitis, a solitary tubercle in the cerebellum and widespread sinus thrombosis. The heart showed marantic thrombi in both sides, and there were multiple pulmonary emboli. The exact cause of the edema was uncertain, but it seemed likely that it was due to the tuberculous enteritis, as similar cases have been described in connection with chronic dysentery: it is supposed that the extensive alteration in the intestinal wall leads to an improper utilization of the food, with the production of a toxic nutritional disorder and edema. No similar case has been found in the literature.—*Ödemkrankheit und Darmtuberkulose. A. Wiechers, Arch. f. Kinderhk., lxix, 450.*

Effect of Tonsil and Adenoid Removal on Children.—*Conclusions:* While the amount of material and figures presented are far too small to justify opinions they at least suggest that: 1. The incidence of heart disease in the great number of children referred for tonsil operations is very small. 2. The cervical lymph nodes enlarge as often after tonsil removal as before. 3. There is more complete relief from symptoms when removal is done at from seven to ten years of age in the majority of cases. 4. Early removal gives mechanical relief for a time, but the original cause of the growths, whatever it may be, is present and active until a much later period.—*The Schoolchild Before and After Tonsil and Adenoid Removal, L. Davis, J. Am. M. Ass., April 22, 1922, lxxviii, 1187.*

Economic Losses from Animal Tuberculosis.—The records of the meat inspection division of the U. S. Bureau of Animal Industry show that during the fiscal year ended June 30, 1921, there were 8,179,572 cattle slaughtered under federal inspection, and 173,328, more than two per cent, were retained on postmortem inspection for tuberculosis. Of the latter, 33,328 were condemned outright and destroyed. The total amount of beef represented in the condemnation of these cattle based upon a live weight of 968 pounds average is equal to 17,421,212 pounds. In the same period 37,702,866 hogs were killed of which 4,693,305 were retained for tuberculosis and 64,830 were condemned outright and destroyed. This is equivalent to 10,403, 918 pounds loss in available meat supply. The loss of organs and parts exceeds this loss on carcasses alone. Using as a basis the per capita consumption of 154.3 pounds of meat per annum, and also that five persons constitute the average American family, the amount of meat loss is equal to a supply to provide the meat diet of 36,063 American families.—*The Econmic Importance of Eradicating Tuberculosis, T. E Wilson, Am. J. Vet. M., April, 1922, lxi, new series, xiv, 55.*

Tuberculous Osteoarthropathy in Dogs.—Swellings on all four feet of tuberculous dogs were observed. The overlying subcutaneous tissues were much thickened, so that the bony structure of these nodules (some 1.5 cm. in height and diameter) often could not be palpated, but the X-ray showed them to proceed from the periosteum. In one animal periosteal elevations were palpable on all bones of the body, including the bones of the pelvis and head. On the skull the most prominent nodules were located on the angular and condyloid processes. The articular surfaces of the joints showed no irregularities.—*Periostische Veränderungen am Skelett bei Tuberkulose des Hundes, D. Wirth, Zeitschr. f. Tuberk., June, 1921, xxxiv, 393.*

Pathology of Tuberculosis.—The pathology of the different types of pulmonary tuberculosis is discussed. The view that adult tuberculosis is the lighting up of a focus acquired in infancy or childhood seems to be becoming more generally accepted and the theory of reinfection or primary infection in adult life is falling into greater disrepute. The reaction in the body to the tubercle bacillus may be one of proliferation or of inflammation; the former is best exemplified in the lymphoid tissues and the latter in the pneumonic exudate. The types of chronic pulmonary tuberculosis are (1) miliary and conglomerate tubercles, (2) tuberculous pneumonia, and (3) cavitation from softening and abscess formation. Miliary and conglomerate tubercles are usually arranged peripherally in the lungs and often are surrounded by an extensive zone of inflammation. Repair, when it occurs, is usually without any evidence of vascular regeneration.—*Pathology of Tuberculosis, L. W. Smith, Boston M. & S. J., March 23, 1922, clxxxvi, 385.*

Primary Complex of Tuberculous Infection of Ranke.—The primary complex of Ranke comprises the primary focus of tuberculous infection and the lymph nodes in the immediate vicinity draining this area. The formation of tuberculous tissue occurs at the primary focus, as well as at the point of of concentration of the bacilli in the lymph nodes. The tuberculous process can extend from both of these foci. The earliest stage of this primary tuberculous complex is a caseating pneumonic process, around which is formed a typical fixed connective tissue

growth which is poor in lymphocytes. This pathological picture can be clearly seen with the X-ray, even though all clinical signs and symptoms be absent. The complex is seen as a sharply defined area often in the very centre of the lung tissue. The X-ray picture of the primary complex can occur with acute or chronic pulmonary tuberculosis and can be observed in adults as well as in children.—*Zur Klinik der primären Komplexes (Ranke), G. Simon, Zeitschr. f. Tuberk., June, 1921, xxxiv, 345.*

Anatomopathological Classification of Lesions in Pulmonary Tuberculosis.—A pulmonary tuberculous process may be classified: (1) According to its extent (quantitative); whether (*a*) unilateral, bilateral, or (*b*) at the apex, upper, middle or lower lobe. (2) According to the anatomic form (qualitative); whether (*a*) productive; that is, fibrotic, fibrotic-nodular or nodular-fibrotic, or (*b*) nodular, or (*c*) exudative, that is, lobular-exudative and caseous bronchopneumonic, or (*d*) lobular-caseous (pneumonic). (3) With or without cavitation.—*Über die Bedeutung der Einteilung der Lungenphthise nach pathologischanatomischen Gesichtspunkten, S. Gräff, Zeitschr. f. Tuberk., October, 1921, xxxiv, 683.*

Histological Changes Produced Experimentally by Acid-fast Bacteria.—One hundred and thirty-seven animals (guinea pigs and rabbits) were infected subcutaneously, intraperitoneally and by inhalation with 12 difference strains of saprophytic acid-fast bacteria, avian, cold-blooded and genuine tubercle bacilli, and examined histologically. The findings did not differ in any way from genuine tuberculosis. The lesions resembled tuberculous changes the more passages through animals undergone by the bacteria used for infection. Sometimes simple necrosis with chromatin granules instead of caseation, diffuse engorgement with lymphocytes or few leucocytes were noted. The latter variations, however, are also obtained in infection with old laboratory strains of tubercle bacilli.—*Tuberkulose-Studien: VI. Über die durch säurefeste Bakterien im Säugetierorganismus experimentell erzeugten histologischen Veränderungen, R. Faffé, Deutsch. med. Wchnschr., June 30, 1921, xlvii, 734.*

Experimental Tuberculosis of Rabbit's Testicle.—It is desirable to have some means of producing in the experimental animal a definite tuberculous lesion, the progress of which can be easily and accurately followed by frequent examination thereof in the living animal. Once such a lesion is produced the effects of treatment can easily be determined. Calmette, Guérin and Gryzez succeeded in producing a cervical and tracheobronchial tuberculous adenitis in the guinea pig by instilling virulent tubercle bacilli in the conjunctival sac. The lesion was found to occur regularly and in a characteristic manner and readily lent itself to examination by inspection. The disease progressed rapidly, however, to the thoracic and abdominal organs and soon resulted in a generalized infection. The most generally employed type of more or less localized tuberculosis, the extent and progress of which can be readily appreciated by inspection, is that of the cornea of the rabbit. It presents, however, so many inherent difficulties that it is of limited usefulness. The production of experimental testicular syphilis has been successfully practised since 1907. Reference to experimental testicular tuberculosis was found twice in the literature. In the writer's first series of experiments several rabbits were inoculated intratesticularly with 0.1 mgm. of human tubercle bacilli, but only a few of the animals developed local lesions, and then only after an incubation period of six to eight weeks. A stronger emulsion was then resorted to, containing 5 mgm. moist tubercle bacilli to the cubic centimetre of physiological salt solution. The lesion usually becomes manifest in from two to three weeks. It is characterized by the appearance of one or more readily palpable nodules either in the body or in the epididymis. The nodules are firm, and vary in size from that of a pea to that of a hazelnut. They grow and tend to coalesce. In only one instance out of thirty-five experiments a scrotal tubercle broke down and discharged caseating material. The pelvic organs never showed any tuberculous involvement and the lesion always remained unilateral. In the liver and spleen a few miliary tubercles were found in 15 per cent of the cases. The duration of the infection apparently bears no relation to the extent of generalization of the tuberculous process. The testicular lesion is progressive. The animals maintained their body weight fairly well throughout the period of observation (up to 126 days).—*Experimental Testicular Tuberculosis in the Rabbit, M. I. Smith, Jour. Med. Res., January–March, 1922, xliii, 46.*

Silicic Acid Metabolism in Tuberculosis.—From a study of 47 postmortems and numerous animal experiments Kahle concludes that there is a relation between silicic acid metabolism and pancreatic function. In tuberculosis and cancer cases the silicic acid metabolism is altered; in active cases of tuberculosis the pancreas contains less silicic acid than normal or completely

healed cases of tuberculosis, while in cancer, on the contrary, there is more silicic acid, provided no operations have been performed on the cases. In cases of carcinoma operated upon the silicic acid content of the pancreas is below normal. In women dying during or shortly after pregnancy the pancreas contains less silicic acid than normal, which is attributed by the author to the increased withdrawal of silicic acid by the fetus. The bad course of an active tuberculosis during pregnancy and in the puerperium is also explained as the result of silicic acid depletion, which occasions a diminished resistance of the body and a lessened likelihood of the formation of a strong capsule and healing of the tuberculosis. Tuberculous guinea pigs treated with silicic acid ran a more favorable and slower course than guinea pigs likewise infected with an lethal dose of bacilli but not treated. The treated animals showed a marked tendency toward encapsulation of the tuberculous foci. *Über die Beziehung des Pancreas zum Kieselsäure-Stoffwechsel und Versuche über therapeutische Beeinflussung experimenteller Meerschweinchentuberkulose durch Kieselsäure-Darreichung, H. Kahle, Beitr. z. klin. d. Tuberk., April 11, 1921, xlvii, 296.*

Lymphocytes in Tuberculosis.—Lymphocytes are produced only in the germinal centres of lymphoid tissues. They appear in the peripheral blood and in exudates in response to rather mild stimuli. Clinically, they are increased in measles, whooping cough, malaria, syphilis, tuberculosis, etc. In diseases which tend to run a prolonged course, a lymphocytosis signifies a good prognosis; while with a decrease of lymphocytes the reverse is true. In tuberculosis such a decrease may be due to invasion of the lymph nodes and destruction of the germinal centres. Of the action of lymphocytes but little is known. In all probability they are nonmotile, nonphagocytic cells. It has been proved that they liberate a fat-splitting and a proteolytic ferment. It is tempting to speculate that the tubercle bacillus with its waxy envelope is attacked by lipolytic ferments liberated by lymphocytes, but this has never been proved. The author reviews the more prominent literature on the subject and reports some experiments of his own, in which guinea pigs were injected intraperitoneally with various "mild" irritants, almond oil, 10 per cent turpentine emulsion, and 1 per cent tincture of iodine. The exudate, withdrawn after twenty-four hours, was a mixture of polymorphonuclear leucocytes and lymphocytes; after two or three days the lymphocytes increased; after five days large lymphocytes predominated; and after nine days the cells were practically all small lymphocytes. Tubercle bacilli were also incubated for twenty days at 37°C. with the spinal fluid of a paralytic patient, with a pleural exudate rich in lymphoctyes and with the blood serum of a tuberculous patient whose blood showed a high lymphocytosis. Two animals were inoculated intramuscularly with 2 cc. of each of these suspensions. All died within four weeks of generalized tuberculosis as did the controls. The blood picture in these animals gave no indication of the severity of their disease. It is significant that the guinea pig which has physiologically a relatively high percentage of lymphocytes should be so susceptible to tuberculosis. In explanation the author suggests that the guinea pig's lymphocyte differs widely from that of the human being in function.—*Über die Lymphocytose, J. Wiecksel, Münch. med. Wchnschr., December 23, 1921, lxviii, 1643.*

Immunity to Tuberculosis.—No true immunity to tuberculosis, but merely a state of lessened sensitivity or at least an increased resistance to tuberculous infection, is known to exist. This protection, however, is found only in those who harbor, no matter in how small numbers, tubercle bacilli and hence have an increased sensitivity to tuberculin and to the tubercle bacillus. Such persons can be in good health in spite of having slight tuberculous foci. This state practically serves the purpose of a genuine immunity, so long as the focus is held in abeyance by the counteracting cellular and humoral forces of the body. This, then, is the condition which has been designated as labile immunity and which Behring asserts occurs in most individuals during childhood. The future condition of this state, whether it endures for the lifetime of the individual or gives way to active, progressive tuberculosis, depends not upon the tubercle bacilli, but upon the tissues that react protectively. If, however, an activation of the process occurs with a resulting clinically active tuberculosis, we have no specific means of killing the tubercle bacillus in the body, but we are able merely to influence the tissues with the tuberculins, and physical, dietetic, climatic, and surgical measures. In what manner these measures influence the tissues in their combat against the invading organisms is, as yet, undetermined.—*Immunität bei Tuberkulose, A. v. Wassermann, Zeitschr. f. Tuberk., October, 1921, xxxiv, 596.*

Immunity to Tuberculosis.—The only immunity that exists to tuberculosis is that conferred by nature, by the slight tuberculous infections of childhood. Our attempts to establish an immunity to tuberculosis have

been futile, not because the tubercle bacillus is not easily resorbed, but rather because our antigens are not sufficiently unlocked, nor the partial antigens properly combined, nor do we possess the proper avirulent bacilli for injection into the human body; the very nature of the tubercle bacillus prohibiting this. An immunizing process must, in order to be effective, imitate nature; to seek an immunity to tuberculosis such as nature has evolved in smallpox is futile.—*Immunität bei Tuberkulose, F. Neufeld, Zeitschr. f. Tuberk., October, 1921, xxxiv, 606.*

Extracts of Tubercles as Immunizing Material.—Reasoning that the tubercle, probably by means of its disintegration products, causes the disease manifestations in tuberculosis rather than the tubercle bacillus (or tuberculin) *per se*, animals were immunized by injecting sterilized (kept 30 minutes at 57°C.) caseous tuberculous masses, freed from all other tissues and obtained from man. Guinea pigs were given 1 cc. at five day intervals for 4 injections. These were tolerated poorly, and finally a calf was immunized with bovine material given intravenously after filtration through cotton. The material did not retard the development of tuberculosis in guinea pigs or rabbits, even though certain deviations from the miliary course of the disease were noted in the treated animals. The serum of the calf agglutinated a tubercle bacillus emulsion and revealed a mild inhibition of hemolysis in complement fixation tests with extracts of tuberculous lymph nodes from calves.—*Zur Heilserumfrage gegen Tuberkulose, K. Preisich and E. Roman, Beitr. z. Klin. d. Tuberk, April 11, 1921, xlvii, 202.*

Allergic Reaction of Uterine Horn of Tuberculous Guinea Pigs.—The experiments recorded in this article are an application of the principle of specific reactivity between antigen and its homologous antibody, employing the sensitive uterus as an indicator. After the publication by Weil in 1917 of his results upon the reaction of the tuberculous guinea pig uterus to old tuberculin, experiments were started with the idea of using this method to detect tubercle protein or specific products of tuberculous metabolism in the urine of cases of tuberculosis. In the recent experiments the urines have all been derived from cases in which acid-fast bacilli (in most cases proved by inoculation to be Bacillus tuberculosis) were demonstrated in the urine. The tests have been conducted by suspending a uterine horn from a tuberculous guinea pig and a horn from a normal guinea pig in the same bath of oxygenated Locke solution. After relaxation of the horns and the appearance of regular rhythmic contractions the urine from one of the cases was added to the solution usually in 3 to 5 cc. amounts. In no instance has this amount of urine from any of the cases induced a marked reaction in the normal horn, while in some cases the uterine horn from the tuberculous animal responded sharply as evidenced by the kymographic record. That the reaction of the latter was not simply an increased susceptibility to urine *per se* and was devoid of specific significance was shown repeatedly by adding to the bath solution first, a normal urine to which no response was secured, and then, after washing and renewing the bath, adding a tuberculous urine with the manifestation of an immediate contraction of the horn from the infected animal. These reactions were conducted with 8 tuberculous urines from known cases, and with 7 of these reactions of the tuberculous horn were secured of greater or less intensity as compared with normal tissue. Apparently, any urine if used in sufficient amount, will throw any uterine horn into contraction; it is therefore essential that quantitative factors be observed. The possibility that the reaction may be of diagnostic value presents itself, but as yet the amount of work done does not warrant such a conclusion.—*An Allergic Reaction of the Tuberculous Uterine Horn. G. H. Smith, Jour. Immunol. January, 1922, vii, 47.*

Effects of Tuberculin.—To obtain knowledge of the fate of tuberculin in the body, the substance was injected into normal animals. After injection, tuberculin rapidly disappears from the vascular system and does not reappear in the urine till after several hours. In the meantime the substance is bound in the body, probably in the bones and in the liver. Living cells *in vitro* also have the faculty of binding tuberculin. Through numerous experiments a difference is demonstrated between the complement of different sera, a fact which strongly supports the theory of the plurality of complements. Evidence is brought forth which points to a difference between tuberculous and nontuberculous complements. Tuberculin is highly noxious to the vitality of the white blood corpuscles, and more toxic to corpuscles from tuberculous than from nontuberculous hosts. A certain protective power in regard to the toxic action of tuberculin is found in the serum. This power is greater in serum from normal persons than in that from the tuberculous. By means of vital staining a difference is demonstrated between the effects of tuberculin upon the leucocytes from normal and tuberculous animals.—*Studies of the Effects of Tuberculin, P. M. Holst, Jour. Hyg., December, 1921, xx, 342.*